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Letter dated 24 August 2016 from the Secretary-General addressed to the President of the Security Council

I have the honour to convey herewith the third report of the Organization for the Prohibition of Chemical Weapons-United Nations Joint Investigative Mechanism.

I should be grateful if the present letter and the report could be brought to the attention of the members of the Security Council.

(*Signed*) **BAN** Ki-moon

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Letter dated 24 August 2016 from the Leadership Panel of the Organization for the Prohibition of Chemical Weapons-United Nations Joint Investigative Mechanism addressed to the Secretary-General

The Leadership Panel of the Organization for the Prohibition of Chemical Weapons-United Nations Joint Investigative Mechanism has the honour to transmit the Mechanism's third report pursuant to Security Council resolution 2235 (2015).

The report provides an update on the activities of the Mechanism up to 19 August 2016. It also outlines the concluding assessments of the Leadership Panel to date, on the basis of the results of the investigation into the nine selected cases of the use of chemicals as weapons in the Syrian Arab Republic.

The Leadership Panel wishes to thank the Secretary-General for the confidence placed in it. The Panel appreciates the indispensable support provided by the Secretariat, including the Office for Disarmament Affairs, the Department for Political Affairs and the Office of Legal Affairs, and the United Nations officials who have assisted the Mechanism in New York, Geneva and Damascus. The Panel likewise appreciates the invaluable support provided by the leadership and staff of the Organization for the Prohibition of Chemical Weapons. The Panel wishes to recognize the outstanding staff of the Mechanism, who have tirelessly and professionally conducted and supported the investigation.

The Leadership Panel is grateful to the members of the Security Council for their support for the Mechanism. The Panel also thanks them and the other States Members of the United Nations for providing essential information and financial resources to the Mechanism during its investigation. The Panel equally recognizes all other organizations, entities and individuals that have assisted the work of the Mechanism.

The Leadership Panel wishes to emphasize that it has conducted its work objectively, independently, professionally and in accordance with the mandate given in Security Council resolution 2235 (2015). The Panel is solely accountable and responsible for its conclusions.

(*Signed*) Virginia **Gamba**
Head
Organization for the Prohibition of Chemical Weapons-United Nations Joint Investigative Mechanism

(*Signed*) Adrian **Neritani**
Leadership Panel

(*Signed*) Eberhard **Schanze**
Leadership Panel

Third report of the Organization for the Prohibition of Chemical Weapons-United Nations Joint Investigative Mechanism

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I. Introduction

1. The present report is submitted pursuant to Security Council resolution 2235 (2015), by which the Council established the Organization for the Prohibition of Chemical Weapons (OPCW)-United Nations Joint Investigative Mechanism with a mandate to identify to the greatest extent feasible individuals, entities, groups or Governments who were perpetrators, organizers, sponsors or otherwise involved in the use of chemicals as weapons, including chlorine or any other toxic chemical, in the Syrian Arab Republic where the OPCW fact-finding mission determined or had determined that a specific incident in the Syrian Arab Republic had involved or had likely involved the use of chemicals as weapons.

2. Two previous reports of the Mechanism (S/2016/142 and S/2016/530) provided information on its methodological approaches and its investigative activities from 24 September 2015, when the mandate began, to 10 June 2016. In addition, the Mechanism has briefed the Security Council on its progress on a monthly basis.

3. The present report provides an update on the activities up to 19 August 2016. It also outlines the concluding assessments of the Leadership Panel to date, on the basis of the results of the investigation into the nine selected cases of the use of chemicals as weapons in the Syrian Arab Republic. The report contains ten annexes: one on the methods of work and one for each of the cases under investigation, as follows:

(a) Kafr Zita, Hama governorate, 11 April 2014;

(b) Kafr Zita, Hama governorate, 18 April 2014;

(c) Talmenes, Idlib governorate, 21 April 2014;

(d) Al-Tamanah, Idlib governorate, 29 and 30 April 2014;

(e) Al-Tamanah, Idlib governorate, 25 and 26 May 2014;

(f) Qmenas, Idlib governorate, 16 March 2015;

(g) Sarmin, Idlib governorate, 16 March 2015;

(h) Binnish, Idlib governorate, 24 March 2015;[1]

(i) Marea, Aleppo governorate, 21 August 2015.

4. The annexes contain narratives of the incidents and detail the findings, assessments and conclusions of the Leadership Panel to date.

II. Background

5. The Mechanism is led by a three-member Leadership Panel, composed of the Head, Virginia Gamba (Argentina), and two deputies, Adrian Neritani (Albania) and Eberhard Schanze (Germany). The deputies are responsible for the Mechanism's political and investigative components, respectively.

[1] The fact-finding mission referred to the date of the incident as being 23 March 2015, but the Mechanism has established that the event occurred on 24 March 2015 at around 1900 hours.

6. The Mechanism consists of a political office based in New York providing political analysis, legal advice, media relations and information management; an investigative office based in The Hague focusing on chemical and medical analysis, forensics, military ordnance analysis and other relevant information analysis; and a planning and operations support office based in New York providing support to the Leadership Panel and the political and investigative components.

7. The Mechanism also established a liaison office in Damascus staffed by a political affairs officer, who acts as the main focal point with the Government of the Syrian Arab Republic and provides up-to-date information and recommendations to the Leadership Panel regarding substantive political matters.

8. To ensure that the Mechanism had appropriate and sufficient resources for the investigation, six specialists, including translators, were employed to strengthen its team in The Hague with the expertise necessary to conduct a professional investigation. The trust fund established to address the material and technical needs of the Mechanism has been used for this purpose.

III. Activities of the Mechanism

9. The initial period of the Mechanism's work from 24 September to 13 November 2015 was taken up by the setting up of the office, both in New York and in The Hague. As explained in the Mechanism's first report (S/2016/142), during this time the Mechanism recruited staff with relevant skills and expertise; held planning meetings and consultations with Member States; adopted measures to ensure the integrity and confidentiality of its work, including protection of documents, evidence and witnesses; began the development and implementation of a records management system within a robust information security regime applicable to all information obtained or generated by the Mechanism; and began its extrabudgetary fundraising to support its activities and its material and technical needs. On 9 November 2015, the Secretary-General informed the Security Council that the Mechanism would begin its full operations on 13 November (see S/2015/854).

10. The period from 13 November 2015 to 29 February 2016 marked the first phase of the investigation, which comprised information collection and planning for case development. On 26 November, the Mechanism and OPCW concluded a memorandum of understanding concerning the provision of access, storage and handling of information, including evidence, obtained by the fact-finding mission and the Mechanism. On the basis of the memorandum of understanding, the Mechanism began work in December with the review and analysis by the investigators of the information and the evidence obtained by the fact-finding mission on those incidents that the mission had investigated and for which it had concluded that toxic chemicals had been used or had likely been used.

11. On 11 December 2015, the United Nations and the Syrian Arab Republic signed an agreement concerning the status of the Mechanism in order to ensure the timely, safe and secure conduct of the mandate of the Mechanism in the country. Shortly thereafter, the Leadership Panel visited Damascus to discuss with the Government the parameters of its cooperation in support of the implementation of resolution 2235 (2015).

12. During the first phase, the Leadership Panel developed the working methods of the Mechanism as related to the conduct of its investigation, including the collection of evidence and other related information and the analysis, verification and corroboration of information. The Panel decided on a methodology for reporting its findings to the Security Council (see sect. IV below). On the basis of a methodology devised by the Mechanism, nine cases were identified for further in-depth investigation, which concluded the first phase.

13. The second phase began on 1 March 2016, when the Mechanism launched its case-by-case investigation. This included the development of case-specific investigation plans to help to guide the overall investigation and the planning process itself. The Mechanism continued to collect additional information not provided by the fact-finding mission and to conduct witness interviews. Several visits to the Syrian Arab Republic and the region were made in support of the investigation. As more information was collected, the investigation moved to analysis, assessment and corroboration, while new data were still being received.

14. Throughout the mandate of the Mechanism, the Leadership Panel continued to actively seek and obtain information relevant to the investigation from Member States, international organizations, non-governmental organizations and other relevant entities and individuals.

15. The Leadership Panel sent formal requests for information to 28 Member States, including members of the Security Council, countries in the region and other relevant Member States, and visited 11 of them at their invitation. Technical visits were also carried out by the investigators. During the visits, and at its offices in New York and in The Hague, the Mechanism received information and technical briefings relevant to the investigation. The Mechanism reviewed and analysed all available fact-finding mission information, in addition to the information and material that it had collected. This included more than 8,500 pages of documents, transcripts of more than 200 interviews, over 950 pieces of photographic material, more than 450 videos obtained from open sources and provided by witnesses, over 300 pages of forensic analysis and more than 3,500 files, including further videos, photographs and audio recordings. Given that a significant amount of the information collected by the Mechanism was available only in Arabic, a large number of documents had to be translated in order to be reviewed. In addition, the investigators recorded numerous witness interviews.

16. The Leadership Panel consistently impressed upon the Government of the Syrian Arab Republic the need to respond promptly to the Mechanism's requests for information. The Panel maintained constant interaction with the Government, including through visits to Damascus in December 2015 and August 2016, through more than 20 bilateral meetings with the Permanent Representative of the Syrian Arab Republic to the United Nations and through the Mechanism's liaison office in Damascus. The Mechanism's investigators also undertook four technical visits to Damascus.

17. The Leadership Panel has held more than 150 bilateral meetings since 24 September 2015 with members of the Security Council and other Member States, both in New York and in The Hague. While several Member States actively supported the Mechanism's investigation by providing information and technical briefings, the Panel regrets that some countries in the region did not contribute more substantially to the investigation.

IV. Methodological considerations

18. The Leadership Panel noted that there were no precedents for an investigation into the identification of perpetrators, organizers, sponsors or those otherwise involved in the use of chemicals as weapons, unlike in the case of the Secretary-General's Mechanism for Investigation of Alleged Use of Chemical and Biological Weapons, for which there are guidelines and procedures (see A/44/561). The Panel therefore adopted methods of work for the Mechanism (see annex I).

19. The statements and conclusions contained in the reports of the fact-finding mission concerning the use of chemicals as weapons were the starting point for the Mechanism's investigation into the nine cases. Furthermore, the Mechanism reviewed the mission's information and evidence "as is", without reviewing the veracity of its sources or any methodology or method of work adopted by the mission.

20. The Mechanism's work was bound by the principles of impartiality, objectivity and independence and it functioned as a non-judicial investigative mechanism. The Mechanism investigated and sought to identify each category of perpetrator, sponsor, organizer or those otherwise involved in the use of chemicals as weapons.

21. In addition to providing the background, the investigation sought to establish for each case the following key elements: (a) date and time; (b) weather conditions; (c) impact location; (d) munition (e.g., remnants); (e) delivery method (e.g., means and direction); (f) damage and effects (e.g., on buildings, the environment, flora and fauna); and (g) medical effects. The key elements were established by the Mechanism through investigation plans and case files and included the following information: fact-finding mission material (reviewed and analysed with a view to extracting information relevant to the Mechanism's investigation); witness interviews and statements (where possible collected as audio and video records or as transcripts); documents, including reports, official documents, medical records and handwritten material (such as drawings and list of names); images, including satellite imagery, photographs and videos; maps; and infographics and other data.

22. Investigation plans were developed for each case to help to guide the overall investigation. During the investigation, case files were prepared to document the details of the information and evidence collected, including any relevant information obtained by the fact-finding mission. The files entailed the analysis of the information collected and documented the process and degree of corroboration on specific issues.

23. The Mechanism aimed to corroborate all information. As necessary, information was subjected to a separate analytical process. On a case-by-case basis, the Mechanism engaged four internationally recognized forensic and defence institutes that had previously provided assistance to United Nations bodies. Such analysis, by its nature, is a time-consuming exercise.

24. The Leadership Panel reviewed the nine case files and the information and evidence contained therein prepared by its investigators. The Panel weighed the information and evidence collected, including their accuracy, credibility and reliability, the degree of corroboration and the analysis obtained from forensic and defence institutes, and came to its findings, assessments and conclusions by

consensus. In so doing, the Panel was guided by the following standards (see S/2016/142):

(a) Overwhelming evidence (highly convincing evidence to support a finding);

(b) Substantial evidence (very solid evidence to support a finding); or

(c) Sufficient evidence (there is evidence of a credible and reliable nature for the Mechanism to make a finding that a party was involved in the use of chemicals as weapons).

25. Where the Leadership Panel determined that there was insufficient evidence in relation to a case investigated by the Mechanism, it reported accordingly.

V. Assessments, findings and conclusions

26. Pursuant to its mandate, the Mechanism was limited to investigating only those cases in which the fact-finding mission had determined that a specific incident in the Syrian Arab Republic had involved or had likely involved the use of chemicals as weapons, including chlorine or any other toxic chemical. The mission had made such determinations in relation to incidents that occurred in the Syrian Arab Republic between April 2014 and September 2015.

27. The lack of access to the locations under investigation owing to the dire security situation on the ground affected the manner in which the Mechanism was able to conduct its investigation. Visits to certain locations would have facilitated the ability of the Mechanism to confirm specific locations of interest, collect comparative environmental samples, identify new witnesses and physically evaluate the material of interest to it (e.g., remnants).

28. Notwithstanding the authority extended to it under resolution 2235 (2015), in particular under paragraph 7 thereof, the Mechanism could not compel the submission of information or documents to it. It thus relied on the voluntary submission of information by sources in possession of relevant information. Similarly, it interviewed only those individuals who willingly agreed to be interviewed without any remuneration. Given the voluntary nature of the information collection process, both parties had to agree to specific terms of cooperation, which addressed confidentiality, national security and the safety of individuals.

29. In addition, the following factors affected the investigation: (a) the investigation was being carried out, in some cases, more than two years after the incident; (b) the lack of a chain of custody for some of the material received; (c) the source of information and material was of secondary or tertiary nature; (d) some of the information material, including that depicting the size and nature of the incident, was misleading; and (e) finding independent sources of information that could provide access to individuals and information material proved difficult.

30. The findings are based on information collected and corroborated by the Mechanism over a five-month period and are representative of the amount and quality of information that it collected in a highly sensitive political environment surrounding a continuing conflict in the Syrian Arab Republic. The conditions referred to above made the investigation exceptionally time consuming and required

significant trust-building and finding ways of engaging with various sources of information.

31. The present report outlines the Leadership Panel's findings, assessments and conclusions to date.

A. Common elements of the cases investigated

32. The Mechanism investigated nine cases, of which eight were related to the use of chlorine or chlorine derivative as a weapon and one was related to the use of sulfur mustard. During its investigation and after having reviewed all material collected by the Mechanism, the Leadership Panel identified the following elements common to the eight chlorine-related cases. These elements should be read in conjunction with the specific findings.

1. Chlorine

33. Chlorine is available to all parties in the Syrian Arab Republic. It is widely used as a disinfectant and as a water purification compound. It is also used in various industries, such as the plastic, pulp and paper, pesticide and pharmaceutical industries. Chlorine is a hazardous material and exposure to a high dosage may be fatal. Those who are especially vulnerable in case of exposure to chlorine are infants, the sick and older persons. Chlorine leaves little to no trace in the human body. In the light of its corrosive and toxic nature, expertise and specialized equipment are required for its safe handling. For example, to transfer chlorine from a 1 ton container to smaller containers, a specialized filling station is required.

34. The efficacy of chlorine as a weapon depends on the type of munition, dissemination methods, terrain characteristics and the prevailing weather conditions.

35. In relation to the five chlorine-related cases from 2014, the inner cylinders of the munition allegedly used were between 30 and 40 cm in diameter and 155 and 175 cm in length. This indicated that the estimated minimum volume of one cylinder was 125 litres. The cylinders were welded and had a central valve and an additional off-centre safety plug on top. They did not follow the international standards of the International Organization for Standardization, which require the storage of chlorine in seamless cylinders with only one valve. Nevertheless, such welded cylinders (with a valve and safety plug) can be used to store chlorine in liquid form in accordance with national standards in some countries. The Leadership Panel notes that these cylinders are readily available and commonly traded around the world.

36. In at least one case, the information of a manufacturer was clearly embossed into a cylinder, together with "CL_2" indicating the presence of chlorine, which is within the industrial norm. In most of the other cases, such details of the inner cylinder could not be seen.

37. These cylinders can be filled and refilled with liquids or compressed gas, but require appropriate equipment.

38. In relation to the three chlorine-related cases from 2015, the information available to the Mechanism indicates that the outer jacket of the munitions allegedly used contained a number of disposable hydrochlorofluorocarbon (HCFC) gas

canisters and plastic bottles that are believed to have contained potassium permanganate. The plastic bottles, in addition to the detonation cord, were taped to the canisters.

39. The HCFC gas canisters, commonly referred to as refrigerant canisters, are widely available because they are used to refill refrigerators and air conditioners. However, they are disposable and their repurposing or refilling would require technical modification of the valve. Technical expertise and equipment would be needed to modify the valve to refill the canisters with liquids or compressed gas.

40. The Syrian-Saudi Chemicals Company had a chlorine production facility producing caustic soda and liquid chlorine 29 km east of Aleppo. The Government stated that the facility had been seized by the Nusrah Front[2] in August 2012 and that the Nusrah Front and some armed opposition groups had the capability to transport chlorine across the country. The Government provided information that approximately 400 tons of chlorine had been present at the plant at the time of its seizure. The Mechanism confirmed that chlorine containers at the facility had been moved after August 2012. No information is available on to where the containers were transported or how their content might have been used.

41. The Government also stated that there was a pulp and paper plant in Dayr al-Zawr, which included a chlorine-producing unit. According to the Government, 59 tons of hydrochloric acid and 3 tons of sodium hypochlorite had been stored at the facility when it was seized by armed opposition groups in the first quarter of 2012. There is open-source information claiming that storage and safety features of the unit were maintained after the plant was seized. This suggests that some chemicals remained stored at the plant.

2. Aircraft

42. In most of the chlorine-related cases, the Mechanism had obtained information, in particular witness statements, referring to the presence of aircraft (rotary and fixed-wing) around the time and location of the incidents under investigation. Depending on the time of the incident (daytime/night-time), the witnesses stated that they had either seen or heard the aircraft. The Mechanism repeatedly requested flight logs, situation reports and other documents of the Syrian Arab Armed Forces from the Government. The Government has not yet provided them.

43. The Government confirmed to the Mechanism that it had been in control of Syrian air space during the incidents reviewed by the Mechanism, although it also stated that, in those cases in which flights might have occurred below the coverage area of radar, it had no capacity to confirm or deny the existence of other aircraft operating in Syrian airspace. The Government specifically confirmed that it controlled Aleppo International Airport, which includes Nayrab airbase (Aleppo governorate), Hama airbase (Hama governorate), Bassel al-Assad International Airport, which includes Humaymim airbase (Ladhiqiyah governorate), and Abu al-Zuhur airbase (Idlib governorate) at the time of the incidents investigated by the Mechanism. During the period under investigation, however, the Government lost control of six airbases, including Taftanaz airbase (Idlib governorate) and Minaq,

[2] On 30 May 2013, the Nusrah Front was designated as a terrorist group by the Security Council in accordance with resolution 1267 (1999).

Kuwayris and Jarrah airbases (Aleppo governorate). Specifically in relation to Taftanaz airbase, the Government informed the Mechanism that 15 helicopters had been left behind, of which 9 had been deemed operational.

44. It should be noted that such aircraft require a high degree of maintenance and specific technical expertise, spare parts and equipment in order to operate. In addition, the modern air defence capabilities of the Syrian Arab Armed Forces make it very unlikely that an aircraft could take off and operate in the western Syrian Arab Republic without being detected and/or destroyed. The Government was requested to provide any information concerning the use of such helicopters by armed opposition groups, but no information has been provided to date. The Government informed the Mechanism that some of the armed opposition groups had access to and had used drones. Given the size of the devices thought to have been used in the chlorine-related cases, however, the small drones reported to be operated by armed opposition groups could not have dropped the devices.

45. After reviewing all the information gathered, the Mechanism found no evidence that armed opposition groups had been operating helicopters at the time and location of the cases investigated.

3. Barrel bombs

46. In all chlorine-related cases, there is an allegation of the use of barrel bombs. These makeshift devices are alleged to have been configured with inner cylinders or canisters filled either with explosives or toxic chemicals within an outer jacket. Given that they are improvised, their size and weight are thought to vary, but experts, on the basis of images of remnants, have estimated that they would weigh between 350 and 400 kg. Barrel bombs filled with explosives would, owing to their destructive capacity, result in large craters and no large fragments of the munition would remain. On the other hand, barrel bombs filled with toxic chemicals would be expected to make smaller craters because they would be likely to contain sufficient explosive charge only to crack open the outer shell to release the chemical, leaving large remnants. The Mechanism was unable to find any information to support the theory that land-based delivery methods such as "hell cannons" and "elephant rockets" had been used to launch such devices in relation to the cases investigated. There was no footage, samples or munition parts in any of the cases that would support the claim of "hell cannon" use. Owing to their weight, it is believed that barrel bombs of such design can be deployed only from helicopters.

47. Having reviewed the information and evidence available to it, the Leadership Panel is of the view that the Syrian Arab Armed Forces used makeshift weapons deployed from helicopters, including those shaped like a barrel. The Government denies possessing barrel bombs. The Panel notes that further studies would be useful to contrast and compare the various munitions used in the nine cases with the remnants from cases not considered by the Mechanism. In relation to the eight chlorine-related cases, the possibility that the munition hit toxic chemicals on the ground could not be ruled out in some cases, in particular because alleged remnants of the devices at impact locations shown had been removed from those locations before their documentation (see paras. 49-51 below).

4. Local early warning systems

48. The Leadership Panel took note that, in most cases, members of the local community had set up an early warning system to issue alerts of approaching helicopters, in some cases specifically referring to purported attacks with toxic chemicals. This was done partly through the interception of radio communications. The local population had been advised to seek shelter in basements in case of air strikes and to escape to upwind positions when chemical alerts were issued. Chemical alerts in some cases were reported to have caused panic among the population. In at least three cases, witnesses referred to false chemical alerts being issued, and in two cases they claimed that houses had been looted after the evacuation. In some of the cases, the description of the local early warning personnel in relation to an attack allegedly conducted by a helicopter was the only record of the delivery method by helicopter.

5. Documentation by others

49. The Leadership Panel found that much of the information on craters and munitions originated either from first responders and medical personnel or internationally supported monitoring groups. New witnesses with relevant and case-specific information that was not based on these sources were difficult to find.

50. In most cases, the documentation of the impact locations, including sampling, was not undertaken immediately after the event but a few days later. Furthermore, remnants of the munition used had been dismantled and removed from the impact location before their documentation. The Mechanism therefore had to re-evaluate the link between the impact location and the remnants, which was not possible in some cases. The Mechanism found that some impact locations had been altered and not all craters tallied with the remnants of the munition. In some cases, it appeared that remnants taken from elsewhere had been placed at the alleged impact locations.

51. Different footage of explosions, impact locations and remnants was uploaded to social media sites, published or provided to the Mechanism with the claim that it was related to the incidents under investigation. However, after thorough analysis of the material, including by forensic institutes, some of the footage showed different locations or explosions from conventional munitions and/or different times. This resulted in the Mechanism investigating additional impact locations and remnants.

B. Specific findings

52. Each of the nine cases investigated required the consideration of multiple narratives. Furthermore, there were allegations of multiple impact locations for the chlorine-related cases, all of which required investigation. However, the Mechanism found that in many of these cases sufficient information was available only for one impact location, while for other alleged impact locations it was extremely scarce, i.e., no relevant information on the remnants, crater, impact and effects was available.

53. In relation to the cases of Talmenes (21 April 2014), Sarmin (16 March 2015) and Marea (21 August 2015), the Leadership Panel had sufficient information to reach a conclusion on the actors involved.

Talmenes, Idlib governorate, 21 April 2014

54. The Leadership Panel examined the existing information regarding the two impact locations in Talmenes on 21 April 2014. There is sufficient information for the Panel to conclude that the incident at impact location No. 2 was caused by a Syrian Arab Armed Forces helicopter dropping a device causing damage to the structure of a concrete block building and was followed by the release of a toxic substance that affected the population.

55. This conclusion was based on the following:

- Ahrar al-Sham and the Nusrah Front had a heavy presence around Talmenes. Both were said to have been in control of the town. Talmenes was subject to regular artillery and air force attacks around and on 21 April 2014. On that day there was an ongoing battle between government forces and armed opposition groups, as well as the Nusrah Front, around the two military bases at Wadi Deif and Hamidiyah, both of which are in close proximity to Talmenes.
- Witnesses stated that the release of toxic chemicals followed the explosion of a barrel bomb dropped from an aircraft.
- Both the Government and the armed opposition groups do not deny that chlorine was used in Talmenes on 21 April 2014.
- The Government stated that the impact (location No. 2) was caused by a land-based projectile launched by an armed opposition group. The structural damage was not found to be consistent with this.
- Only one of the two alleged impact sites (location No. 2) has been found plausible by the Mechanism.
- When the incident occurred, the Government had lost control of six airbases, including Taftanaz airbase (Idlib governorate). The Government informed the Mechanism that 15 helicopters had been left behind at Taftanaz airbase, 9 of which had been deemed operational.
- The Leadership Panel reviewed all the information gathered and found no evidence that armed opposition groups in Talmenes had been operating a helicopter at the time and location of the incident.
- While the exact number of patients could not be definitively established, it is obvious that large numbers of people were affected by toxic chemicals.

Sarmin, Idlib governorate, 16 March 2015

56. The Leadership Panel examined the existing information regarding the two impact locations in Sarmin on 16 March 2015. There is sufficient information for the Panel to conclude that the incident at impact location No. 2 was caused by a Syrian Arab Armed Forces helicopter dropping a device that hit the house and was followed by the release of a toxic substance, matching the characteristics of chlorine, that was fatal to all six occupants. The remnants of the device are consistent with the construction of a barrel bomb.

57. This conclusion was based on the following:

- Witnesses confirmed that at least one helicopter flew over Sarmin at the time of the incident.

- Expert and forensic analyses support witness statements that a device or "barrel bomb" dropped from a helicopter impacted through the ventilation shaft of a house (impact location No. 2) inhabited at the time by a family of six. The damage was consistent with the kinetic effect of a device or barrel bomb falling from high altitude rather than the explosion or detonation of any high explosive.
- Multiple videos of location No. 2 show HCFC gas canisters inside the house, with a purple substance on the floor.
- The Government indicated that there had been no Syrian Arab Armed Forces flights on 16 March 2015, but did not provide any supporting information. However, the Mechanism obtained information from other sources that corroborates witness statements of Syrian Arab Armed Forces helicopter flights on the date and at the time of the incident.
- When the incident occurred, the Government had lost control of six airbases, including Taftanaz airbase (Idlib governorate). The Government informed the Mechanism that 15 helicopters had been left behind at Taftanaz airbase, 9 of which had been deemed operational.
- The Leadership Panel reviewed all the information gathered and found no evidence that armed opposition groups in Sarmin had been operating a helicopter at the time and location of the incident.

Marea, Aleppo governorate, 21 August 2015

58. The Leadership Panel examined the existing information regarding the incident in Marea on 21 August 2015 and determined that there was sufficient information to conclude that Islamic State in Iraq and the Levant (ISIL)[3] was the only entity with the ability, capability, motive and means to use sulfur mustard in Marea on 21 August 2015.

59. This conclusion was based on the following:

- Marea had been a traditional stronghold of armed opposition groups, which were fighting against government forces. On 21 August 2015, ISIL advanced westward towards Marea.
- Several witnesses and a number of other sources provided information that Marea had been bombarded by around 50 artillery shells, several of which filled with sulfur mustard, from the east or south-east, an area under the control of ISIL.
- On that and the following days a number of people went to hospital with symptoms related to exposure to sulfur mustard.
- A large number of photographs and videos of the munition used in Marea were received and analysed by the Mechanism. Four sources stated that the munition used was 130-mm artillery shells. The photographs and videos of the munition are consistent in relation to the release of a dark viscous liquid from the artillery shell.

[3] On 30 May 2013, ISIL was designated as a terrorist group by the Security Council in accordance with resolution 1267 (1999).

60. In relation to the cases of Kafr Zita (18 April 2014), Qmenas (16 March 2015) and Binnish (24 March 2015), the Leadership Panel was close to having sufficient information to reach a conclusion on the actors involved and recommends further investigation of the three cases.

Kafr Zita, Hama governorate, 18 April 2014

61. The Leadership Panel examined the existing information and evidence regarding the incident in Kafr Zita on 18 April 2014 and determined that the Syrian Arab Armed Forces had executed air strikes in that area on that day. However, the Panel could not confirm the use of barrel bombs because the remnants of the device allegedly used had been removed and could not, at the current stage, be linked with certainty to impact location No. 2.

62. The Leadership Panel determined that the case merited further investigation.

63. This assessment was based on the following:

- On 18 April 2014, armed opposition groups and the Nusrah Front were present in Kafr Zita. This area was subject to regular artillery and airborne attacks by the Syrian Arab Armed Forces, some of which were conducted on 18 April 2014.
- The Government has confirmed that, on the date and at the time of the incident, the Syrian Arab Armed Forces conducted an air strike on an observation post and targeted a house used as depot for explosive devices. When the house was struck, a noxious, green gas was emitted.
- Both the Government and armed opposition groups do not deny that chlorine was used in Kafr Zita on 18 April 2014.
- Only one impact site (location No. 2) has been confirmed by the Mechanism. However, the Mechanism could not determine whether the impact crater was caused by a barrel bomb or another munition, such as a mortar round.
- The remnants of the munitions allegedly used were not found at or near the alleged impact locations because they were removed and brought to another location. While several pictures of remnants have been published by an open source in relation to the incident of 18 April 2014, the additional information on the remnants has not been sufficient to corroborate the impact location.

Qmenas, Idlib governorate, 16 March 2015

64. The Leadership Panel examined the existing information regarding the incident in Qmenas on 16 March 2015 and determined that a Syrian Arab Armed Forces helicopter had dropped one device or barrel bomb in Qmenas.

65. Although the Leadership Panel was close to having sufficient information to reach a conclusion on the actors involved, at the current stage it could not draw a conclusion with certainty as to whether the device or barrel bomb contained explosives or chlorine.

66. The Leadership Panel determined that the case merited further investigation.

67. This assessment was based on the following:

- According to witness statements, a helicopter dropped two devices at the edge of a military zone in Qmenas. However, only one impact location, as provided by three different witnesses, could be corroborated through forensic analysis of pictures and satellite images.
- The remnants of a device found near the impact crater resemble the remnants of barrel bombs found near other impact sites, most notably in Sarmin. Nevertheless, from the analysis of the remnants and the crater it was not possible to determine whether the device contained explosives or toxic chemicals.
- The Mechanism was offered alternative descriptions of the event, such as the accidental release of gas from a barrel that fell from a vehicle operated by an armed opposition group, or opposition fighters using a "hell cannon" filled with chemicals against other armed opposition groups. The Mechanism was unable to obtain any credible information that would support those alternatives.
- The Mechanism obtained information that a helicopter passed over Qmenas on the date and at the time of the incident.
- The Government indicated that there had been no Syrian Arab Armed Forces flights on 16 March 2015 in the area, but did not provide any supporting information. However, the Mechanism obtained information from other sources that corroborates the helicopter flights on the date and at the time of the incident.
- When the incident occurred, the Government had lost control of six airbases, including Taftanaz airbase (Idlib governorate). The Government informed the Mechanism that 15 helicopters had been left behind at Taftanaz airbase, 9 of which had been deemed operational.
- The Leadership Panel reviewed all the information gathered and found no evidence that armed opposition groups in Qmenas had been operating a helicopter at the time and location of the incident.

Binnish, Idlib governorate, 24 March 2015

68. The Leadership Panel examined the available information regarding the incident in Binnish on 24 March 2015 and was able to confirm the existence of a canister with traces of chlorine or a chlorine-like substance. It has received additional information in relation to remnants of the outer jacket of a device that is consistent with the construction of a barrel bomb.

69. The Leadership Panel was close to having sufficient information to reach a conclusion on the actors involved on the basis of the chain of custody for the remnants found and the overall findings of the fact-finding mission. However, there are inconsistencies in the case, including the link between the remnants and the impact site or sites, accounts of the explosion and the individuals affected, which are being further investigated.

70. This assessment was based on the following:

- According to three witnesses, a Syrian Arab Armed Forces helicopter dropped a device or "barrel bomb" with chemicals at night over Binnish. However, there are inconsistencies in relation to the date and time of the incident, the

impact location or locations and the description of the exposure to toxic chemicals suffered by the local population.

- Notwithstanding the inconsistencies and scarcity of information surrounding this case, the Mechanism has been able to corroborate some key elements, such as the remnants recovered by local respondents from an agricultural field in Binnish, which were subsequently recorded and documented. The remnants found at location No. 1 — the outer jacket, a canister and a plastic bottle — are consistent with the construction of a barrel bomb. The canister and the content of the plastic bottle were analysed by a laboratory, which found traces of chlorine or a chlorine-like substance in the canister. The laboratory also concluded that the content of the plastic bottle had been potassium permanganate. The chain of custody for the remnants was established.

- The Mechanism could not obtain any information concerning the explosion of the device. Nevertheless, it has received information on the impact location, which is being forensically analysed.

71. In relation to the cases of Kafr Zita (11 April 2014) and Al-Tamanah (29 and 30 April 2014 and 25 and 26 May 2014), the Leadership Panel found that there was either contradictory or insufficient information to reach a conclusion on the actors involved and does not recommend further investigation of the three cases.

Kafr Zita, Hama governorate, 11 April 2014

72. The Leadership Panel examined the existing information and evidence regarding the incident in Kafr Zita on 11 April 2014 and determined that the Syrian Arab Armed Forces had executed air strikes in that area on that day. At least one explosion resulted from the air strike.

73. The Leadership Panel could not confirm the use of barrel bombs because the remnants of the device allegedly used had been removed from the site and could not be linked to any of the impact locations.

74. While a significant number of people — up to 150 — may have been exposed to chlorine on 11 April 2014, the Leadership Panel determined that there was insufficient information at the current stage to draw a conclusion on the actors involved.

75. This assessment was based on the following:

- On 11 April 2014, the Nusrah Front and several armed opposition groups were present in Kafr Zita. This area was subject to regular artillery and airborne attacks by the Syrian Arab Armed Forces. Such attacks were continuing on 11 April 2014.

- The Government confirmed that it had targeted, on the date and at the time of the incident, the house of a Nusrah Front commander, which the Government alleges was used to build improvised explosive devices and store chlorine.

- Both the Government and armed opposition groups concurred that chlorine had been used in Kafr Zita on 11 April 2014.

- None of the five alleged impact locations could be confirmed by the Mechanism.

- Two open-source videos show an explosion in Kafr Zita caused by a device dropped from an aircraft. Another video shows a separate explosion. The Mechanism could not, however, determine whether the latter explosion had been caused by a device dropped from an aircraft or by ground-based munitions. Furthermore, the two explosions could not be associated with chlorine-specific attacks.
- The remnants of the munitions allegedly used had been removed from the alleged impact locations to other locations.

Al-Tamanah, Idlib governorate, 29 and 30 April 2014

76. The Leadership Panel determined that there was insufficient information to confirm or to exclude the possibility of a chemical attack and that there was contradictory and insufficient evidence to draw a conclusion on the actors involved.

77. This assessment was based on the following:

- There is scarce relevant information about all incidents in Al-Tamanah. No flight movements could be established by the Mechanism.
- There are discrepancies in the statements made by witnesses and the descriptions of the event are inconsistent. On the one hand, some witnesses described people affected by the use of chlorine as a weapon. On the other hand, other witnesses described air strikes in Al-Tamanah in or at the end of April 2014 and stated that chemicals had not been involved in any of the attacks.
- This incident has been considered by experts to stem from an attack with conventional munitions.

Al-Tamanah, Idlib governorate, 25 and 26 May 2014

78. The Leadership Panel examined the existing information and evidence regarding the incident in Al-Tamanah on 25 and 26 May 2014 and determined that there was insufficient evidence to draw a conclusion on the actors involved and the modality of the use of chemicals as weapons in this incident.

79. This assessment was based on the following:

- There is scarce relevant information about all incidents in Al-Tamanah. No flight movements could be established by the Mechanism.
- Several witnesses stated that, since April 2014, "false" chemical weapons alerts had occurred frequently at non-regular intervals and that no chemicals had ever been used as weapons in Al-Tamanah.
- Other witnesses reported an unexploded "barrel bomb" that leaked chlorine. There was insufficient evidence to corroborate that testimony, however.

VI. Concluding remarks

80. Immediately after its establishment, the Leadership Panel noted a decrease in the number of allegations of use of chemicals as weapons in the Syrian Arab Republic. However, such allegations have continued during its mandate and, more recently, have included various chemical agents, some among them listed as

chemical weapons under the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction.

81. The allegations of the use of Convention-listed chemical weapons and/or toxic chemicals as weapons in the Syrian Arab Republic received by the Mechanism from Member States between December 2015 and August 2016 include sarin (13), sulfur mustard (12), VX (4), chlorine (41) and other toxic chemicals or agents (61). The information suggests the involvement of both the Government and other actors in these alleged incidents.

82. The Leadership Panel reiterates its strong conviction that the use of chemicals as weapons, for any reason and under any circumstances, is totally abhorrent. The Panel reaffirms its belief that it is absolutely crucial to hold those who use or intend to use chemicals as weapons accountable for their acts.

83. The Leadership Panel wishes to convey its appreciation for the full cooperation received from Member States, international organizations and other entities in support of its work to date, including the generous financial contribution received.

84. Lastly, the Leadership Panel wishes to express its appreciation for the support received from the Secretariat, in particular the Office for Disarmament Affairs, and from the technical secretariat of OPCW.

Annex I

Methods of work

1. There were no precedents for an investigation into the identification of perpetrators, organizers, sponsors or those otherwise involved in the use of chemicals as weapons, unlike in the case of investigations into the alleged use of chemical weapons, for which there are guidelines and procedures established for use by the Secretary-General's Mechanism for Investigation of Alleged Use of Chemical and Biological Weapons (see A/44/561). Consequently, in the absence of a framework to guide its efforts to fulfil its unprecedented mandate, the Joint Investigative Mechanism developed operating guidelines and procedures with the aim of identifying those involved in the use of chemicals as weapons in order to ensure that its work adhered to the principles of impartiality, objectivity and independence.

Overview

2. The information obtained by the Organization for the Prohibition of Chemical Weapons fact-finding mission was reviewed "as is" and the conclusions contained in its reports formed the starting point of the work of the Mechanism. The material collected by the mission was reviewed and analysed by the Mechanism with a view to extracting information relevant for the identification of perpetrators, organizers, sponsors or those otherwise involved in the use of toxic chemicals as weapons.

3. The Mechanism's mandate was implemented in two phases. The first, pertaining to information collection and planning for case development, consisted of reviewing and analysing the mission's data, mapping the incidents (i.e., identifying specific incidents in which the mission had carried out an investigation and determined the use or likely use of chemicals as weapons) screening and prioritization of the incidents (in terms of severity, delivery method and munition, quantity of data and information) and developing an investigation plan and methodology, including evidentiary standards and relevant procedures. The second, pertaining to case investigation, consisted of in-depth analysis of the cases identified during the first phase and continued until sufficient information had been gathered, analysed, assessed and corroborated to allow the Mechanism to present its findings to the Security Council.

Information management

4. The Mechanism took measures to ensure that its personnel complied with the confidentiality and security protections set out in the memorandum of understanding concluded between the Mechanism and the Organization for the Prohibition of Chemical Weapons on 26 November 2015 concerning the provision of access to and storage and handling of information. All personnel were also required to enter into individual confidentiality undertakings.

5. In addition, the Mechanism applied the Secretary-General's bulletin on information sensitivity, classification and handling (ST/SGB/2007/6) in relation to the information that it collected and produced. Furthermore, relevant sections of the

Secretary-General's bulletin on record-keeping and the management of United Nations archives (ST/SGB/2007/5), concerning the creation, management and disposition of records, were applied.

6. The Mechanism adopted standard operating procedures and guidelines on information management, as well as the conduct of interviews; collection of evidence and information, including chain of custody forms; and analysis of information.

Collection of information and evidence

7. In addition to information and evidence obtained by the fact-finding mission, the Mechanism gathered information from the following:

(a) The Government of the Syrian Arab Republic and all parties in the Syrian Arab Republic;

(b) Other States Members of the United Nations;

(c) International organizations, international and national non-governmental organizations, other entities and individuals;

(d) Open sources.

8. The information and evidence collected by the Mechanism included witness interviews and statements given to other entities (where possible collected as audio and video records or as transcripts); documents, including reports, medical records and handwritten material; images, including satellite imagery, photographs and videos; and infographics and other data. Furthermore, the Mechanism collected forensic analysis, laboratory results and other material such as maps.

Information from the Government of the Syrian Arab Republic

9. At the Mechanism's request, documents and other supporting material, such as reports, slide presentations, videos, photographs, maps and diagrams, on the nine cases were provided by the Government of the Syrian Arab Republic. The Government also facilitated interviews with some witnesses. Furthermore, the Mechanism met representatives of the Government, including members of the armed forces, during its missions to Damascus.

Information from all parties in the Syrian Arab Republic

10. The Mechanism held meetings with armed opposition groups, during which information on the cases under investigation was provided. One group facilitated an interview with a witness. The Mechanism also met the National Coalition of Syrian Revolutionary and Opposition Forces. Furthermore, other parties provided documents to the Mechanism.

Information from Member States

11. The Mechanism received case-specific information from 14 Member States. It collected further material to obtain independent confirmation of the information received or used such information to confirm its information or its understanding of the cases under investigation.

Information from international organizations, non-governmental organizations, other entities and individuals

12. The Mechanism established a network of contacts in possession of relevant information on the cases under investigation. This included international organizations, non-governmental organizations, the private sector, research organizations, laboratories and institutes, civil society organizations and individuals.

13. This network of contacts provided information and facilitated access to witnesses.

Open sources and social media

14. Extensive material is available on open sources and social media relating to the cases under investigation, mainly in Arabic. The Mechanism reviewed videos and other media files available online allegedly documenting the incidents, including the munition used and the remnants thereof, the delivery method and the impact and effects resulting from use. Material deemed central to the investigation was subjected to forensic analysis.

Compiling of the information

15. Investigation plans were developed for each case to help to guide the overall investigation. During the investigation, case files were prepared to document the details of the information and evidence collected, including any relevant information obtained by the fact-finding mission. The files entailed the analysis of the information collected and documented the process and degree of corroboration on specific issues. Annexes II to X are based on those files.

16. In addition to providing the background, the investigation sought to establish for each case the following key elements: (a) date and time; (b) weather conditions; (c) impact location; (d) munition (e.g., remnants); (e) delivery method (e.g., means and direction); (f) damage and effects (e.g., on buildings, environment, flora and fauna); and (g) medical effects.

Weather conditions

17. The Mechanism received weather-related information for the dates and places under investigation from the World Meteorological Organization (WMO). In providing the information, WMO stated the following:

> The coverage of weather stations across [the Syrian Arab Republic] was very poor during the [periods in question] which makes it extremely difficult to assess weather conditions at the requested locations from observations. One station was close to Kafr Zita ... so data from that site was used where appropriate. [In addition...] short range forecasts from a world-leading high resolution global atmospheric model have been used ... These forecasts are initiated from our best estimate (analysis) of the state of atmosphere ... Satellite imagery [have also been used] to provide supplementary information, notably for weather descriptions.

18. Furthermore, WMO has informed the Mechanism that, while the humidity values and temperature data provided are thought to be relatively accurate (within 2°C for temperature), the wind direction/speed data are not as accurate because they can

be subject to significant variability on timescales of minutes. Nevertheless, the values indicated are believed to be reasonable as 60-minute averages. The times of the sunrise and sunset were taken from www.esrl.noaa.gov/gmd/grad/solcalc/sunrise.html.

Analysis, verification and corroboration of information

Corroboration and analysis

19. The Mechanism aimed to corroborate information. In this connection, identifying circular reporting was important in order to ensure that the corroboration was in fact from separate sources of information.

20. As necessary, information material collected by the Mechanism was subjected to a separate analytical process. On a case-by-case basis, the Mechanism engaged four internationally recognized forensic and defence institutes that had previously provided assistance to United Nations bodies. These forensic institutes worked on, among other things, verifying whether videos and photographs had been modified or altered, determining the dates and times when a video had been made or a photograph taken and verifying the locations depicted. The defence institutes provided analysis of imagery, munitions-related issues, explosions and modelling of the dispersion of chlorine in the atmosphere. The Mechanism also consulted a ballistic and explosive expert on the imagery of the points of impact.

Analysis and review

21. As part of the analytical process, an analytical/review team was established to ensure the technical adequacy of the information collected, consistency in all the cases under investigation and the identification of patterns emerging from the cases. During the process, the information received was mapped and entered into a database. Several standard tools, such as those used for making projections of information against continuous/discontinuous variables and reconstructive evidence-gathering, were used.

Assessment

22. The Leadership Panel carefully reviewed the material submitted by the investigators in the case files, which included the information collected by 10 August 2016. The Panel weighed the information and evidence collected and came to its findings, assessments and conclusions by consensus.

23. The Leadership Panel decided that, in reporting its findings to the Security Council, a sufficient degree of supporting evidence was required; that is, there was evidence of a credible and reliable nature to determine that a party was involved in the use of chemicals as weapons on the date and at the time of the incident in which the fact-finding mission had determined use or likely use. In so doing, the Panel was guided by the following standards:

(a) Overwhelming evidence (highly convincing evidence to support a finding);

(b) Substantial evidence (very solid evidence to support a finding); or

(c) Sufficient evidence (there is evidence of a credible and reliable nature for the Mechanism to make a finding that a party was involved in the use of chemicals as weapons on the date and time of the incident investigated).

24. Narratives of the incidents and a summary of the information and evidence collected are contained in annexes II to X, as are a summary of the findings and concluding assessments.

25. Where the Leadership Panel determined that there was insufficient evidence in relation to a case investigated by the Mechanism, it reported accordingly.

Challenges and constraints

26. As was the case with the fact-finding mission, the lack of access to the locations under investigation owing to the dire security situation on the ground affected the manner in which the Mechanism was able to conduct its investigation. Visits to certain locations would have facilitated the ability of the Mechanism to confirm and have access to specific locations of interest, collect comparative environmental samples, identify new witnesses and physically evaluate the material of interest (e.g., remnants).

27. Other challenges and constraints include the following factors: (a) the period elapsed since the incident (in some cases, more than two years); (b) the lack of a chain of custody for some of the material received; (c) the source of information and material was of secondary or tertiary nature; (d) some of the information material, including that depicting the size and nature of the incident, was misleading; (e) finding independent sources of information that could provide access to individuals and information material proved difficult; and (f) the impact locations were not preserved and had been compromised by the time that they were recorded (e.g., the videos and photographs of the locations were taken days after the incident and in many cases after the remnants had been removed from the location).

Ethical issues and considerations

28. In conducting its investigation and in particular its interviews, the Mechanism gave full consideration to the privacy and protection of all individuals concerned. All vital information was kept confidential and the identity of witnesses was protected at all times. An identity number, assigned to each witness, was used for the processing of data. The master list with the names of the witnesses was kept secure by the Mechanism. Throughout the investigation, the Mechanism made all efforts to respect religious values and norms, national customs and the personal pressures and traumas associated with exposure to conflict.

Annex II

Kafr Zita, 11 April 2014

Findings of the fact-finding mission

1. The fact-finding mission reached the following conclusion with regard to the information collected:

> This constitutes a compelling confirmation that a toxic chemical was used as a weapon, systematically and repeatedly, in the villages of Talm[e]nes, Al-Tamanah, and Kafr Z[i]ta in northern Syria. The descriptions, physical properties, behaviour of the gas, and signs and symptoms resulting from exposure, as well as the response of the patients to the treatment, leads the FFM to conclude, with a high degree of confidence, that chlorine, either pure or in mixture, is the toxic chemical in question.[1]

2. The mission further stated:

> Kafr Zita and its neighbourhood have been subjected to some 17 attacks involving the use of toxic chemicals, with the first attack occurring on the night of 10 April 2014, and the latest incident being reported to the Mission on 30 August 2014. Because of the frequency of these attacks and constantly living in a war zone, the witnesses had essentially lost their sense of the dates and times of the various incidents. Witnesses informed the Mission that all except one of the attacks (which happened between 1800 and 1900 hours on 11 April 2014) occurred at night.[2]

3. The incident on 11 April 2014 between 1800 and 1900 hours is listed by the mission as the second attack with toxic chemicals in Kafr Zita, with 12 patients (including patients from the first incident on 10 April 2014).[3]

Mechanism's investigation

Background

4. Kafr Zita (Hama governorate, Muhradah district) is located 30 km north of Hama, at the administrative border with Idlib district. It is approximately 8 km west of Murak, which sits on the M5 motorway, running from Damascus to Aleppo. Hama city and the Hama military airfield are approximately 30 km south-south-east of Kafr Zita. Muhradah village, on the M56 motorway, running from Damascus to Ladhiqiyah, and the Muhradah dam and hydroelectric power plant are 8 km to the south.

5. According to a census conducted in 2004, the Kafr Zita subdistrict had 39,302 inhabitants. Throughout 2014, high movements of internally displaced persons saw that figure rise considerably. It was indicated in a report by the Office for the Coordination of Humanitarian Affairs that more than 61,000 people were

[1] See S/2015/138, enclosure III, annex 2, para. 29.
[2] See ibid., enclosure IV, annex 2, para. 5.59.
[3] See ibid., table 6.

considered in need of humanitarian assistance in August 2014, of whom 39,500 were internally displaced.

6. The Government of the Syrian Arab Republic stated that it had not been in control of Kafr Zita since 20 December 2012. Thereafter, the town was contested. Throughout 2014, it saw a high intensity of conflict, with frequent air strikes and artillery, mortar and rocket fire reported.

7. In 2014, the government presence in Idlib consisted of networks of checkpoints and military installations: one running along the M5 motorway between Ma'arrat al-Nu'man and Khan Shaykhun and the other along the M4 motorway connecting Ladhiqiyah to Idlib city. At the time, the Government was committed to its obligation to transfer its chemical weapon stockpiles to Ladhiqiyah for maritime removal.

8. From early 2014 onward, several armed opposition groups concentrated their efforts in Idlib governorate on cutting the Government's access to its military bases and Aleppo via the M5 motorway. At the time of the first incident, Murak had recently been captured by armed opposition groups, but was contested by the Syrian Arab Armed Forces and armed opposition groups.

9. The Government stated that its troops had been located 5 km west of Kafr Zita. Reports indicate that national defence forces had been established in Muhradah and Suqaylibiyah. Most of the immediate neighbouring villages of Kafr Zita were contested at the time.

10. Early in 2014, armed opposition groups and Security Council-designated terrorist organizations,[4] such as the Nusrah Front, and their affiliates were present in Kafr Zita. Some reports indicate that the city had been partly under the control of Islamic State in Iraq and the Levant (ISIL) until 6 January 2014.

11. Armed opposition groups present included Faylaq al-Sham, an alliance of several groups formed in March 2014, and Jaysh al-Izzah, an alliance of several smaller groups, most of which were linked to the Free Syrian Army.

12. At the time, alliances were shifting, smaller groups merging into larger groups and blocs beginning to emerge. The open fighting between armed opposition groups and Security Council-designated terrorist organizations that characterized the second half of 2014 had not yet begun and most of the groups were concentrating on their fight against the Government. However, armed opposition groups were in competition for fighters, resources and influence and often had quite diverging ideologies. Hence, the situation in Kafr Zita, in which many armed opposition groups were present, was volatile.

13. Ahrar al-Sham was active throughout Hama and Idlib in 2014, with several reported activities in the vicinity of Kafr Zita in April. The group stated, however, that it had not been present in Kafr Zita in April 2014.

14. At the time of the events, there were two hospitals in Kafr Zita, referred to as the western hospital (No. 5) and the eastern hospital (No. 6). The eastern hospital, according to the fact-finding mission,[5] was destroyed in an attack later in 2014.

[4] On 30 May 2013, Islamic State in Iraq and the Levant and the Nusrah Front were designated as terrorist groups by the Security Council in accordance with resolution 1267 (1999).

[5] See S/2015/168, enclosure IV, annex 2, para. 5.56.

Narratives

15. The description provided in the fact-finding mission report indicates that, on 11 April 2014 between 1800 and 1900 hours, the public was informed about imminent attacks through messages relayed on handheld radios. Shortly before sunset, a helicopter dropped a barrel bomb containing a cylinder filled with chlorine on Kafr Zita. A gas cloud rose to some 50-60 m and then settled towards the ground, moving in the direction of the air current. A strong, pungent and chlorine-like smell was noticeable from a significant distance and disappeared after some 30-45 minutes. Several Member States provided information supporting this description. Other entities published reports stating that a helicopter or "plane" had dropped a barrel purportedly containing chlorine.

16. The Government stated that, on 11 April 2014, the house of a Nusrah Front commander,[6] used to manufacture explosives and car bombs, had been targeted. Upon impact, the house had exploded and the odour of chlorine had spread through the town, injuring and killing a number of internally displaced persons. Six fighters affiliated with the Nusrah Front from a neighbouring village had been in the house and died in the attack. Several barrels of chlorine had been stored in the house.

17. The Government further stated that the Nusrah Front had then tried to blame the use of chlorine on the Syrian Arab Armed Forces. To that end, it had fabricated a video that portrayed false evidence. Another source supported the view that the video had been staged. In particular, the Government and that source claimed that a physician who had been a witness for the fact-finding mission had been involved in the fabrication of evidence.

18. The fact-finding mission provides an alternative description of the incidents on the basis of the testimony of another witness, namely that, when a helicopter flew in the direction of Kafr Zita, armed men fired a so-called "hell cannon" in the direction of the town. Yellow and white smoke emerged, and the witness smelled a bad odour and experienced difficulty breathing. At the hospital, other patients experienced the same symptoms.

19. The events received broad media coverage. Some media outlets indicated that the Government had attacked Kafr Zita with toxic chemicals, while others quoted the Syrian State television assertion that fighters affiliated with the Nusrah Front had used chlorine in an attack against Kafr Zita.

Date and time

20. The fact-finding mission stated that the attack had happened on 11 April 2014 between 1800 and 1900 hours, shortly before sunset. The Mechanism reviewed the mission's witness statements that referred to the incident. Two witnesses specifically referred to the incident and confirmed the time. This was corroborated by further statements. One witness stated that, a few minutes after 1800 hours, several barrel bombs had been dropped on Kafr Zita.

21. Several sources uploaded videos to the Internet, claiming that they showed the attack involving "toxic chemicals" in Kafr Zita on 11 April 2014. One (v01) shows a large explosion shortly before sunset (1903 hours). The end of the evening prayer can be heard. The metadata analysis indicates that the video was indeed uploaded on

[6] Name redacted.

11 April 2014 at 1923 hours. The metadata do not, however, contain indications as to when the video was filmed.

22. A second open-source video (v02) published on 11 April 2014 (a date not confirmed by forensic analysis) is labelled "Kafr Zita — The moment of the fall of the explosive barrels carrying toxic materials from helicopters". Although the results of a forensic analysis were pending at the time of writing, there are several strong indications that the second part of the video appears to show the same explosion as video v01. In the first part, it shows a helicopter dropping a device and follows it while falling. There appears to be a cut between the view of the falling device and the first image of the explosion, however. Further forensic analysis to assess how much time passed between the two segments that appear to have been spliced is pending.

23. A third video (v03) shows a different large explosion during daylight. It is labelled as showing an explosive barrel impacting Kafr Zita. Metadata analysis indicates that it was uploaded on 11 April 2014 at 1739 hours. Although, again, it cannot be excluded that the video was uploaded on 11 April but filmed beforehand, the videos provide an indication that several attacks may have happened in Kafr Zita on that date, as indicated by a witness.

24. One witness reported having seen a "hell cannon" being fired at a helicopter in the direction of Kafr Zita in March or April 2014.

25. Another source stated that a spontaneous explosion of a car laden with unidentified explosives had resulted in the death of six fighters affiliated with the Nusrah Front. The explosion had been accompanied by a strong smell of chlorine in the air and several dozen civilians had been poisoned, and some killed. The Mechanism could not obtain information to support this description.

Weather conditions

26. The sunset on 11 April 2014 was at 1903 hours. Between 1800 and 1900 hours, the temperature fell from 23°C to 19°C, with a relative humidity of between 72 and 76 per cent. The wind came from the north-west (310°) at 1 to 2 m/s.

Impact location

Location No. 1

27. A witness stated that a barrel bomb had fallen on "more than one house" on the west side of the western (No. 5) hospital. The explosion, which looked "different, the smoke was yellowish/orange", could be seen from the western hospital. To corroborate the impact location, the Mechanism established the location of that hospital, as a reference point, from four sources.

28. A witness visited the impact location several days after the incident and recorded the visit. In the video (v04), a Global Positioning System (GPS) application on a tablet shows the coordinates as N35.372950° E36.589800°, which would match the description provided by the witness.

29. None of the additional witnesses confirmed or provided additional information with regard to the location. The resolution of the satellite imagery available to the Mechanism for the area was too low to identify any signs of impact. Repeated

requests notwithstanding, the Mechanism was not provided with military satellite imagery for the date and location in question.

Location No. 2

30. Through forensic analysis of video v01, a potential impact area of the explosion at sunset was determined. The location given by the two witnesses is further west. Hence, the crater at location No. 1 shown in video v04 does not result from the air strike in video v01, although the explosion and resulting cloud, as well as the time, resemble the description given by the witness.

Location No. 3

31. In video v03, an impact with several detonations in series over a wide area can be seen and heard. A yellowish cloud emanates from the impact. The forensic analysis indicates that the impact occurred in the south-west region of Kafr Zita.

Location No. 4

32. The Government stated that the coordinates of the house of the Nusrah Front commander targeted on that date were N35.373189° E36.599503°.

33. None of the videos appear to show this attack, however, given that the coordinates are neither located in the potential impact areas as determined by the video analysis, nor do they match the account of the witnesses. A comparison of satellite images of the house before and after 11 April 2014 shows damage, probably resulting from an explosion.

Location No. 5

34. The witness who spoke about the impact of a hell cannon described the impact location as "close to the big mosque" and showed it on a map (N35.373642° E36.602564°). Publicly available satellite images from 2 May 2014, a few weeks after the attack, show a potential crater approximately 25 m from this location.

35. The impact location does not match any of the other locations. It is 200 m from the eastern hospital (No. 6).

Munition

36. The determination of the munition was based on witness statements, videos of the explosion and remnants, in addition to available photographs.

Location No. 1

37. According to a witness, the remnants from location No. 1, together with remnants from other incidents, were collected and stored outside Kafr Zita. In a video (v04) filmed on 23 April 2014, the location is shown, which includes coordinates on a GPS application on a tablet (N35.354700° E36.584417°). Comparing the reference points seen in the video with a map, the GPS coordinates appear credible.

38. Video v04 and other open-source videos show remnants said to be from location No. 1. Those remnants had been moved from the actual impact location to another location on the outskirts of the village. Several videos and pictures show

remnants from Kafr Zita, but it remains unclear to which incident, date and location they are linked.

39. The witness stated that the remnants from location No. 1 had included an outer jacket and an inner cylinder. That description matches the remnants seen in video v04. The measurements of the remnants are 160 cm in length (157 cm inner cylinder) and 60 cm in diameter (40 cm inner cylinder).

40. A journalist took pictures at the same location 12 days after the attack and published 59 of them. The same remnants can be seen in the pictures as in the witness' video, which is likely to have been filmed at the same location.

41. No further witnesses identified by the Mechanism could provide information to confirm that the remnants in the pictures had been removed from the crater at location No. 1. The munition could not be linked to the impact location and crater through image analysis.

42. One witness stated that the explosion at location No. 1 had been large and people had initially thought it an attack with a conventional munition, stating that "the smoke was yellowish/orange in addition to the dust caused by the explosion". Another witness stated that the explosion at location No. 1 had been "very big" and could be heard from one village to another. That witness described the cloud as being 50-60 m high, spreading quickly because of wind coming from the west.

43. A witness said that, when the first barrel had been dropped about 400 m from where he/she was, it had resulted in a massive explosion with yellowish fumes, which had begun moving eastward with the wind and smelled like chlorine.

44. Reports from two independent entities state that a helicopter dropped a big container that fell between four houses and exploded without making the usual sound of an explosion, releasing an unusual yellow-orange smelly gas within a circle of 500 m.

Location No. 2

45. The descriptions given by the witnesses resemble the explosion seen in video v01. Two of them had described the location as location No. 1, however.

46. The explosion in video v01 has a yellow base. According to a forensic examination, the cloud is the result of the detonation of an "oxygen-deficient military high explosive type (e.g. TNT)", causing a dark cloud. The yellow colour is judged to be dust. According to weapon experts, both from the Mechanism and independent, the explosions appear to result from an "advanced military munition with a primary detonation and delayed subdetonation".

Location No. 3

47. In video v03, an impact with several detonations in series over a wide area can be seen and heard. A yellowish cloud emanates from the impact. The Mechanism's munitions experts, in conjunction with external independent experts and research institutes, concluded that the impact had probably resulted from a conventional military munition, potentially combined with sub-munitions. The title and description of the video do not indicate links to chemicals.

48. The Mechanism could not exclude the possibility that the blast shown in the video originated from ground-based explosives.

Location No. 4

49. The Government has not provided information on the munition used, despite it having been sought on numerous occasions. The Mechanism received no information on footage of or remnants from this location.

Location No. 5

50. The witness stated that the munition had been delivered by a device called a "hell cannon". A drawing of the munition made by the witness resembles a possible projectile, also described by various open sources. A liquefied petroleum gas or propane gas cylinder is repurposed and filled with explosives and shrapnel. Welded to the payload is a metal tube (the tail) about the same circumference as the cannon's muzzle.

51. The Government provided information on armed opposition groups using hell cannons to launch improvised explosive devices allegedly filled with explosives, often fertilizer, on the basis of reports of independent entities and open sources. The experts' assessment, however, is that the munition as described by the witness is extremely unlikely to have been filled with chlorine.

Delivery method

Location No. 1

52. One witness saw a helicopter drop a device on 11 April 2014 at around 1800 hours. Another stated that "monitors informed that a helicopter was dropping barrel bombs" and that, looking from a window, he or she had seen a "barrel bomb coming down". The report of another organization that documented the events contains a reference to a helicopter taking off from Hama military airport and at 1800 hours targeting the western area of the village.

53. While there are multiple witness statements regarding a helicopter from different sources, the Mechanism has not been able to independently corroborate by means other than witness statements that a helicopter was flying in Kafr Zita between 1900 and 2000 hours.

Location No. 2

54. Video v01, showing the detonation around sunset, was reviewed to ascertain the delivery method. An independent research institute and the Mechanism's munitions experts were of the view that "the explosive charges [were] delivered by dropping from an aircraft". In the video, an object can be seen falling in a rather vertical angle, just before the detonation, in the direction of the detonation site. A sound resembling that of a jet fighter can be heard. There are, however, many possible explanations for that sound.

55. The Government shared its analysis of video v01, stating that it showed an air strike with a conventional munition.

56. Video v02, which appears to show the explosion at location No. 2 (seen in video v01), also shows a helicopter. Given that the video appears to be cut between

the images of the helicopter and the explosion, however, the helicopter cannot be linked to the explosion through the video.

Location No. 3

57. An independent analysis of video v03 indicates that the munition was dropped from an aircraft, as indicated in the title of the video. The video is considered not linked to exposure with chlorine.

Location No. 4

58. The Government, while confirming the attack, did not confirm whether it was undertaken through air strikes or land-based attacks.

Location No. 5

59. "Hell cannon" is a name used to describe a class of mortar-like improvised firearms. A number of home-made variants have appeared in the Syrian Arab Republic. When fired, the force of the explosion takes the path of least resistance, pushing the projectile towards the target at high velocity. Flight-stabilizing fins, which are part of the tail ensemble, ensure that the cylinder does not tumble. It is considered extremely unlikely that the projectile described by the witness would have been launched from a hell cannon.

Unclear location

60. The Mechanism notes that two other witnesses interviewed by a different entity refer to helicopters in Kafr Zita on that day. One was at home at the time of the incident and heard a helicopter hovering at around 1800 hours. A few minutes later, the helicopter dropped several barrels specifically on the western part of Kafr Zita. The other, who was not in Kafr Zita at the time of the incident, reported that "the nature of the attacks involved air strikes launched by regime warship helicopters that dropped barrel bombs loaded with chlorine which exploded, producing yellowish fumes that smelled like chlorine cleanser". Another entity was quoted by international media referring to a "plane" that dropped a barrel containing chlorine.

61. The Government provided information relating to land operations, namely that, in response to attacks against its positions, the Syrian Arab Armed Forces used cannons against armed opposition groups in several locations, including Kafr Zita, resulting in a number of opposition fighters being killed or injured and vehicles and equipment being destroyed.

62. Video v02, which appears to show the explosion at location No. 2, also shows a helicopter. Given that the video appears to be cut between the images of the helicopter and the explosion, however, the helicopter cannot be linked to the explosion through the video.

Damage and effects

Location No. 1

63. The crater depicted in video v04 is approximately 200 cm deep and 400 cm wide. Forensic analysis was inconclusive with regard to determining its origin.

64. The fact-finding mission refers to a video showing a crater of 3.6 m in diameter and 1.4 m in depth, with minimal damage to buildings in the vicinity. A screenshot was included as appendix 21 to its report. After thorough analysis, however, the investigation team concluded that it was a picture of a crater in Talmenes, not Kafr Zita.

Location No. 4

65. A comparison of satellite images before and after the event on 11 April 2014 showed considerable damage, probably resulting from an explosion.

Medical effects

66. Witnesses and other sources indicated that up to 150 patients had been treated in the two hospitals on 11 April 2014. Three people had died in the aftermath of the events. A total of 100 patients had been treated in the eastern hospital and 50 in the western hospital. Several patients had been referred to a neighbouring country for further treatment.

67. According to a witness, one person died from exposure to toxic substances. The other two died from other injuries.

68. An external research institute conducted a basic simulation of the dispersion of a chlorine plume in Kafr Zita. The model predicted three deaths in a distance of 50 m from the impact location and 120 affected in a distance of 400 m. The Mechanism used this dispersion model at the potential impact locations in Kafr Zita to assess the effect on the population.

Location No. 1

69. On satellite images, 30 houses were located within the plume dispersion area (400 m) at location No. 1. On the assumption that an average of four people were in each house close to sunset, the number of 120 people affected might be possible. For this area, 150 patients stands above the expected number of affected people, in particular if it is considered that one witness referred to location No. 1 as an uninhabited area.

70. It is also possible, however, that more people may have been in the village or the area. In addition, two of the three people who died, according to witnesses, did not die of chlorine exposure; some of the patients may have suffered from other injuries and/or anxiety.

71. The Government and one other source accused armed opposition groups and individuals of fabricating false report regarding patients, saying that they were "filming and taking photographs of the affected population, including children, with a view to presenting the episode as a chemical attack by government forces". A local physician was allegedly directly involved in preparing fake footage, paid by other Member States to fabricate the claims. There is no evidence to support that statement.

Location No. 4

72. According to the Government, there were injuries and deaths among internally displaced persons, in addition to six fighters affiliated with the Nusrah Front. The

investigators analysed the effect of the destruction at location No. 4 on the assumption that toxic chemicals were stored in the building and released in the explosion. It was estimated that the greatest impact would probably be less than 100 m from the house.

73. It is plausible that people inside the house died and that the neighbouring houses were affected, causing exposure to civilians. The investigators estimated that some 30 houses would fall within this perimeter. A dispersion analysis was not possible owing to the lack of information on the kind and quantity of toxic substances stored in the house.

Location No. 5

74. The witness saw yellow and white smoke and smelled a bad odour, as never experienced before. The witness and family members experienced difficulty breathing. In a first interview, the witness mentioned having seen a 3-year-old girl exhibiting laboured breathing, secretions and cyanosis in hospital. In a second interview, the witness referred only to opposition fighters being treated for other injuries. The Mechanism could not gather additional information to corroborate the witness' testimony.

Leadership Panel's assessment

75. The Leadership Panel examined the existing information and evidence regarding the incident in Kafr Zita on 11 April 2014 and determined that the Syrian Arab Armed Forces had executed air strikes in that area on that day. At least one explosion resulted from the air strike.

76. The Leadership Panel could not confirm the use of barrel bombs because the remnants of the device allegedly used had been removed from the site and could not be linked to any of the impact locations.

77. While a significant number of people — up to 150 — may have been exposed to chlorine on 11 April 2014, the Leadership Panel determined that there was insufficient information at the current stage to draw a conclusion on the actors involved.

78. This assessment was based on the following:

- On 11 April 2014, the Nusrah Front and several armed opposition groups were present in Kafr Zita. This area was subject to regular artillery and airborne attacks by the Syrian Arab Armed Forces. Such attacks were continuing on 11 April 2014.
- The Government confirmed that it had targeted, on the date and at the time of the incident, the house of a Nusrah Front commander, which the Government alleges was used to build improvised explosive devices and store chlorine.
- Both the Government and armed opposition groups concurred that chlorine had been used in Kafr Zita on 11 April 2014.
- None of the five alleged impact locations could be confirmed by the Mechanism.

- Two open-source videos show an explosion in Kafr Zita caused by a device dropped from an aircraft. Another video shows a separate explosion. The Mechanism could not, however, determine whether the latter explosion had been caused by a device dropped from an aircraft or by ground-based munitions. Furthermore, the two explosions could not be associated with chlorine-specific attacks.

- The remnants of the munitions allegedly used had been removed from the alleged impact locations to other locations.

Annex III

Kafr Zita, 18 April 2014

Findings of the fact-finding mission

1. The fact-finding mission reached the following conclusion with regard to the information collected:

> This constitutes a compelling confirmation that a toxic chemical was used as a weapon, systematically and repeatedly, in the villages of Talm[e]nes, Al-Tamanah, and Kafr Z[i]ta in northern Syria. The descriptions, physical properties, behaviour of the gas, and signs and symptoms resulting from exposure, as well as the response of the patients to the treatment, leads the fact-finding mission to conclude, with a high degree of confidence, that chlorine, either pure or in mixture, is the toxic chemical in question.[1]

2. The mission further stated:

> Kafr Zita and its neighbourhood have been subjected to some 17 attacks involving the use of toxic chemicals, with the first attack occurring on the night of 10 April 2014, and the latest incident being reported to the Mission on 30 August 2014. Because of the frequency of these attacks and constantly living in a war zone, the witnesses had essentially lost their sense of the dates and times of the various incidents. Witnesses informed the Mission that all except one of the attacks (which happened between 18:00 and 19:00 on 11 April 2014) occurred at night.[2]

3. The incident on 18 April 2014 at around 2230 hours is listed in the fact-finding mission report as the fifth attack with toxic chemicals in Kafr Zita, with 35 patients.[3]

Mechanism's investigation

Background

4. Kafr Zita (Hama governorate, Muhradah district) is located 30 km north of Hama, at the administrative border with Idlib district. It is approximately 8 km west of Murak, which sits on the M5 motorway, running from Damascus to Aleppo. Hama city and the Hama military airfield are approximately 30 km south-south-east of Kafr Zita. Muhradah village, on the M56 motorway, running from Damascus to Ladhiqiyah, and the Muhradah dam and hydroelectric power plant are 8 km to the south.

5. According to a census conducted in 2004, the Kafr Zita subdistrict had 39,302 inhabitants. Throughout 2014, high movements of internally displaced persons saw that figure rise considerably. It was indicated in a report by the Office for the Coordination of Humanitarian Affairs that more than 61,000 people were considered

[1] See S/2015/138, enclosure III, annex 2, para. 29.
[2] See ibid., enclosure IV, annex 2, para. 5.59.
[3] See ibid., table 6.

in need of humanitarian assistance in August 2014, of whom 39,500 were internally displaced.

6. The Government of the Syrian Arab Republic stated that it had not been in control of Kafr Zita since 20 December 2012. Thereafter, the town was contested. Throughout 2014, it saw a high intensity of conflict, with frequent air strikes and artillery, mortar and rocket fire reported.

7. From early 2014 onward, several armed opposition groups concentrated their efforts in Idlib governorate on cutting the Government's access to its military bases and Aleppo via the M5 motorway. At the time of the first incident, Murak had recently been captured by armed opposition groups, but was contested by the Syrian Arab Armed Forces and armed opposition groups.

8. The Government stated that its troops had been located 5 km west of Kafr Zita. Reports indicate that national defence forces had been established in Muhradah and Suqaylibiyah. Most of the immediate neighbouring villages of Kafr Zita were contested at the time.

9. Early in 2014, armed opposition groups and Security Council-designated terrorist organizations,[4] such as the Nusrah Front, and their affiliates were present in Kafr Zita. Some reports indicate that the city had been partly under the control of Islamic State in Iraq and the Levant (ISIL) until 6 January 2014.

10. Armed opposition groups present included Faylaq al-Sham, an alliance of several groups formed in March 2014, and Jaysh al-Izzah, an alliance of several smaller groups, most of which were linked to the Free Syrian Army.

11. At the time, alliances were shifting, smaller groups merging into larger groups and blocs beginning to emerge. The open fighting between armed opposition groups and Security Council-designated terrorist organizations that characterized the second half of 2014 had not yet begun and most of the groups were concentrating on their fight against the Government. However, armed opposition groups were in competition for fighters, resources and influence and often had quite diverging ideologies. Hence, the situation in Kafr Zita, in which many armed opposition groups were present, was volatile.

12. Ahrar al-Sham was active throughout Hama and Idlib in 2014, with several reported activities in the vicinity of Kafr Zita in April. The group stated, however, that it had not been present in Kafr Zita in April 2014.

13. At the time of the events, there were two hospitals in Kafr Zita, referred to as the western hospital (No. 5) and the eastern hospital (No. 6).

Narratives

14. The description that emerged from the testimony of witnesses interviewed by the fact-finding mission was that, on 18 April 2014 at around 2230 hours, a helicopter dropped two barrel bombs containing cylinders filled with chlorine.

15. The Government provided another description of the events, namely that the Syrian Arab Armed Forces conducted an air strike against an observation post of the Nusrah Front or an affiliated group in the north-eastern part of the town. Fighters

[4] On 30 May 2013, Islamic State in Iraq and the Levant and the Nusrah Front were designated as terrorist groups by the Security Council in accordance with resolution 1267 (1999).

had launched from there an improvised explosive device, at the tip of which a gas cylinder had been attached. After the rocket had been fired, it had emitted an odour and a thick, white smoke. The group exploited the situation and produced videos, alleging that the Syrian Arab Armed Forces had fired shells containing chlorine gas. At the same time, the Syrian Arab Armed Forces also targeted the house of a person affiliated with a specific armed opposition group that was used as depot for explosive devices. When the house exploded, a noxious, green gas was emitted. The opposition, with the help of a local physician, created false evidence that blamed the chemical attack on the Syrian Arab Armed Forces.

16. An alternative description provided by another source indicated that Nusrah Front fighters had used mortar shells filled with chlorine. The Mechanism could not obtain information to support that narrative, including with regard to the impact location, munition and the delivery mechanism used.

Date and time

17. Two witnesses stated that, on 18 April 2014 at 2245 hours, two barrel bombs had fallen on Kafr Zita. Another stated that the attack had happened at around 2300 hours.

Weather conditions

18. The sunset on 18 April 2014 was at 1909 hours. The temperature between 2200 and 2300 hours was between 19°C and 20°C. The wind direction varied, at a speed of 1 m/s.

Impact location

Location No. 1

19. A witness indicated that one barrel bomb had impacted within a 50 m radius of the eastern (No. 6) hospital. The Mechanism identified the location of that hospital as the reference point in two videos retrieved from open sources. The location was confirmed by a witness and the Government.

20. No further information is available on the crater at this impact location and it was not possible to corroborate the information.

Location No. 2

21. A witness stated that one of the two barrels had been dropped on the Kafr Zita football field. The day after the incident, the barrel bomb had been removed from the crater by an "engineering battalion". The Mechanism could not identify any new witnesses who could corroborate that information.

22. On 23 April 2014, a witness went to the football field area where the second barrel bomb had reportedly impacted and registered the coordinates at N35.3731667° E036.5973167°. In a satellite image analysis, an anomaly that looks like a crater can be seen.

Location No. 3

23. The Government gave the location of the farm targeted by the Syrian Arab Armed Forces as N35.3843222° E36.6145250°.

24. A comparison of open-source satellite imagery from before and after the event did not show signs of an impact having occurred in the area. An anomaly that looks like a crater was already present in September 2012.

Location No. 4

25. The Government gave the location of the house that it had also targeted as N35.3721417° E36.6025000°, in front of the big mosque.

26. Comparison of open-source satellite imagery showed no significant damage before and after 18 April 2014. Better pictures of a higher resolution are, however, required for confirmation. The Mechanism requested high-resolution military imagery, but did not receive it.

Munition

Location No. 1

27. No information is available.

Location No. 2

28. In the footage from the impact location, no remnants can be seen. A witness stated that all remnants had been moved to another location outside Kafr Zita. That witness provided a video (v01) of the purported remnants filmed at that location. The device consists of an outer jacket of 114 cm in length and 45 cm in diameter and an inner cylinder of the same length and 30 cm in diameter.

29. The title of an open-source video (v02) published on 18 April 2014 indicates that it shows an "engineering battalion Mohamad" dismantling a barrel bomb filled with chemicals in Kafr Zita at night. According to a visual comparison, the remnants resemble those seen in video v01.

30. Video v02 shows an outer barrel with an inner cylinder that appears to have been repainted. A blue detonating cord is wrapped around the opening where the valve had been attached. The valve was removed from the cylinder, but it appears that the cylinder, which had an additional safety plug, did not explode. The rest of the device appears intact. Any gas leakage would, therefore, have been from where the valve was attached.

31. Both the inner cylinder and outer jacket are metallic, which means that it would require at least 4 m of detonating cord to breach the walls of both the inner cylinder and the outer jacket. Tape was used to attach the detonation cord to the surface of the inner cylinder.

32. Forensic examination of the video that shows the impact site found that no remnants or remaining fragments could be seen at the site, "which suggests the detonation pit is old (>24 hours) when filmed" and "makes it difficult to assess the size and thereby the cause of the formation of the detonation pit".

33. Appendix 19 to the fact-finding mission report (S/2015/138) also contains a sketch of an improvised barrel bomb and a screen grab from a video showing a barrel bomb. They show a larger cylinder and smaller containers. Labels added to them indicate that the smaller containers are filled with sulphuric acid. There is, however, no connection between the cylinder valve and the sulphuric acid.

Accordingly, it does not appear to be an improvised explosive. Furthermore, the cylinder is intact and does not match the remnants shown in other footage from Kafr Zita for the case.

34. Several pictures of remnants have been published by an open source in relation to the incident. The Mechanism could not find additional information to corroborate that the remnants were from that incident.

Locations Nos. 3 and 4

35. The Government has not provided information on the munition used in targeting both locations. The Mechanism could not obtain other information on the munition used from other sources.

Delivery method

Location No. 1

36. A witness indicated that one barrel bomb had impacted within a 50 m radius of the eastern hospital (No. 6). No further information could be found.

Location No. 2

37. Witnesses said that they had heard about an approaching helicopter through a radio system. One specifically referred to the approach of a helicopter at 2245 hours. The attack occurred at night and none of the witnesses stated that they had seen a helicopter.

38. While there are witness statements regarding a helicopter, the Mechanism has not been able to independently corroborate that a helicopter was flying in Kafr Zita at 2230 hours.

39. A witness took measurements and recorded a video of the crater said to be from 18 April 2014. The crater was 300 cm in diameter and between 100 and 110 cm in depth. An external expert stated that that kind of crater could occur if a barrel bomb with a cylinder filled with chlorine had been dropped from a helicopter at high altitude and hit the ground orthogonally or somewhat obliquely.

40. Another external ballistic expert stated that the large detonation pit diameter, in combination with the shallow depth, suggested that the munition had detonated on or directly beneath the surface. The large diameter and geometry of the detonation pit suggest that a large-calibre mortar round (120 mm or more) may have hit and detonated at the site filmed. It cannot be excluded, however, that other possible munitions, such as a barrel bomb or another type of bomb dropped from a helicopter or an aircraft, created the crater.

Location No. 3

41. The Government had initially stated that an air strike had been directed against the position. As mentioned above, the Mechanism could not obtain footage showing the impact, and satellite image analysis yielded no results with regard to signs of an air strike.

Location No. 4

42. The Government did not specify the delivery method for the location. It did, however, provide general information on operations in the area, namely that, as a response to attacks against Syrian Arab Armed Forces positions, firepower "by means of canons" was used in several locations, including Kafr Zita. As mentioned above, the Mechanism could not obtain footage showing the impact and satellite image analysis yielded no results with regard to signs of an air strike.

Damage and effects

Location No. 1

43. The damage and effects are unknown.

Location No. 2

44. Soil samples from the crater on the football field were taken by a witness and handed over to two Member States. The Mechanism reviewed the results of the analysis, which indicated the presence of chlorinated compounds.

45. The Mechanism requested a ballistic/explosive expert to analyse the images of the crater. The expert reported the following:

> The crater arising is somewhat larger than the practical maximal predicted for [a barrel bomb filled with chemicals] ... the inner gas cylinder is quite heavy and pointed, it may be expected to penetrate deeper than the predicted value. There may also possibly have been an additional explosive charge in the bomb. If this would be the additional main contributor to the cratering it would be expected to have been of the order of about 2 kg of TNT-equivalent. This is judged to be too much if resulting from detonating cord present in the bomb only, but could well be the result of the chlorine gas streaming out violently from the pressure vessel in bomb after it impacted and penetrated into the ground.

Locations Nos. 3 and 4

46. The damage and effects are unknown.

General

47. The distance between the locations indicated by different sources leads the Mechanism to consider the possibility that there were more than two places targeted on this date.

48. There are contradictions, insufficient information and tampering with impact sites. The Mechanism therefore could not reach a conclusion on this event.

Medical effects

49. The fact-finding mission indicates that there were 35 patients in relation to the incident. No deaths were recorded. A witness stated that approximately 30 people had been affected and gone to hospital. Two others said that around 100 people had been injured in total. One witness specified that tens of people had been suffocating from the impact in the football field and people near the second impact site (close to

the eastern hospital) had been suffering from shortness of breath and suffocation, among them medical staff in that hospital.

50. Too little information was available on topography, obstacles, locations, population density and characteristics (age, gender and health conditions). A simulation of the plume dispersion therefore did not yield tangible results.

Leadership Panel's assessment

51. The Leadership Panel examined the existing information and evidence regarding the incident in Kafr Zita on 18 April 2014 and determined that the Syrian Arab Armed Forces had executed air strikes in that area on that day. However, the Panel could not confirm the use of barrel bombs because the remnants of the device allegedly used had been removed and could not, at the current stage, be linked with certainty to impact location No. 2.

52. The Leadership Panel determined that the case merited further investigation.

53. This assessment was based on the following:

- On 18 April 2014, armed opposition groups and the Nusrah Front were present in Kafr Zita. This area was subject to regular artillery and airborne attacks by the Syrian Arab Armed Forces, some of which were conducted on 18 April 2014.
- The Government has confirmed that, on the date and at the time of the incident, the Syrian Arab Armed Forces conducted an air strike on an observation post and targeted a house used as depot for explosive devices. When the house was struck, a noxious, green gas was emitted.
- Both the Government and armed opposition groups do not deny that chlorine was used in Kafr Zita on 18 April 2014.
- Only one impact site (location No. 2) has been confirmed by the Mechanism. However, the Mechanism could not determine whether the impact crater was caused by a barrel bomb or another munition, such as a mortar round.
- The remnants of the munitions allegedly used were not found at or near the alleged impact locations because they were removed and brought to another location. While several pictures of remnants have been published by an open source in relation to the incident of 18 April 2014, the additional information on the remnants has not been sufficient to corroborate the impact location.

Annex IV

Talmenes, 21 April 2014

Findings of the fact-finding mission

1. The fact-finding mission reached the following conclusion with regard to the information collected:

> This constitutes a compelling confirmation that a toxic chemical was used as a weapon, systematically and repeatedly, in the villages of Talm[e]nes, Al-Tamanah, and Kafr Z[i]ta in northern Syria. The descriptions, physical properties, behaviour of the gas, and signs and symptoms resulting from exposure, as well as the response of the patients to the treatment, leads the FFM to conclude, with a high degree of confidence, that chlorine, either pure or in mixture, is the toxic chemical in question.[1]

2. The mission further stated that "Talmenes village was attacked with toxic chemicals on two separate occasions, first on 21 April 2014 and again on 24 April 2014".[2]

Mechanism's investigation

Background

3. Talmenes (Idlib governorate, Ma'arrat al-Nu'man district) is located 5 km east of the district capital, Ma'arrat al-Nu'man, on one of two highways that connect the district capital with villages to the east, including Abu al-Zuhur and the nearby airbase.

4. According to a census conducted in 2004, Ma'arrat al-Nu'man district had 58,008 inhabitants, 11,359 of whom lived in Talmenes. In 2014, according to the fact-finding mission, around 20,000 people, including several thousand internally displaced persons, were living in the town. According to a report of the Office for the Coordination of Humanitarian Affairs, more than 65,500 people were in need of humanitarian assistance in the district in August 2014, including 23,000 internally displaced persons.

5. The Nusrah Front[3] and Ahrar al-Sham were reported to have had a heavy presence around Talmenes and to have been involved in frequent clashes with the Syrian Arab Armed Forces. Ahrar al-Sham claimed that it and Firqah 13 controlled Talmenes, while others claimed that the Nusrah Front had been in control. Faylaq al Sham had a presence in the area, and several other armed opposition groups, including the Hawks of the Levant, may also have been present.

6. Several sources, including the Government of the Syrian Arab Republic, stated that Islamic State in Iraq and the Levant (ISIL) had largely retreated from Idlib by

[1] See S/2015/138, enclosure III, annex 2, para. 29.
[2] See ibid., enclosure IV, annex 2, para. 5.6.
[3] On 30 May 2013, the Nusrah Front was designated as a terrorist group by the Security Council in accordance with resolution 1267 (1999).

March 2014. According to that information, ISIL had not been present in Talmenes at the end of April 2014, with its next position more than 30 km away.

7. On 5 March 2014, armed opposition groups launched an offensive in the area. The front line lay to the west of Talmenes, between the village and the Syrian military base at Wadi Deif; armed opposition groups effectively controlled the territory east of the M5 motorway. By 4 April 2014, armed opposition groups had succeeded in cutting off supply lines to the two Syrian military bases of Wadi Deif and Hamidiyah for the second time that year and laid siege to those bases. The Government stated that Wadi Deif had been completely surrounded at the time.

8. There were contradictory witness statements about the situation in Talmenes in April 2014. Some witnesses indicated that the village had been experiencing daily attacks, while others stated that it had largely been spared. Media and open sources contain very few references to attacks in Talmenes. There were, however, many reports of clashes in nearby Ma'arrat al-Nu'man.

9. It is indicated in the fact-finding mission report that the Siddiq hospital in Talmenes had very limited resources and facilities, offering only basic medical aid. The more severe cases were transferred to hospitals in Bab al-Hawa and Saraqib.

Narratives

10. It is stated in the fact-finding mission report (S/2015/138) that, on 21 April 2014, between 1030 and 1045 hours, two "barrel bombs" were dropped on the village in the neighbourhood around the "big mosque". They impacted two residential properties. The people from the neighbourhood sought refuge from the air strike at an olive grove to the east of the village. A gas cloud, of the colour of honey wax to yellow, rose from the impact site of one of the bombs to a height of some 50-75 m. It was very dense and smelt pungent, irritating and "of chlorine". The cloud moved with the wind towards the east and settled at a height of some 1-1.5 m above the ground and covered the main escape route to the east. Approximately 200 people were affected and 3 died.

11. The Government confirmed that there had been an incident in Talmenes on 21 April 2014. According to its description, an armed opposition group fired a projectile from Ma'ar Shamarin, south of Talmenes, that fell in the centre of the village, close to a residential house that was one of the properties mentioned in paragraph 10 above. The impact caused substantial damage and two people died. The Government further said that an armed opposition group used the incident to accuse the Syrian Arab Armed Forces of having fired a projectile armed with chlorine gas. Its description included no information on the use of chlorine gas or affected people. One witness reported having heard the explosion and smelled an odour like "rotten eggs", but not having seen any injured people.

12. Another source provided an assessment indicating that an ISIL firing position for an unguided missile launcher in the area experienced a spontaneous detonation while launching a live round, releasing an unidentified toxic gas. The explosion allegedly resulted in the death of the missile launcher's operating personnel, the "intoxication" of 83 civilians and the death of livestock. The Mechanism could not obtain additional information to support the allegation, or even an ISIL presence at an operational distance.

Date and time

13. A video (v01), provided by a witness, includes eyewitness statements. One of the individuals in the video stated that an "air strike" had taken place on 21 April 2014 at around 1100 hours and both munitions had landed within 200 m of the "big mosque". According to a forensic examination, the metadata indicated that the video had originally been captured on 23 April 2014. It was noted, however, that metadata could be altered. The Government confirmed that an incident had occurred on 21 April 2014, but did not specify the time.

14. On 25 April 2014, an international newspaper published an article about the attack that occurred in Talmenes on 21 April 2014 on the basis of its own investigations.

Weather conditions

15. On 21 April 2014, between 1000 and 1100 hours, the wind in Talmenes was blowing from west to east (250°-270°) at 3 m/s. The temperature was around 19°C to 21°C, with a relative humidity of 74 to 77 per cent.

Impact location

16. According to a witness, the "air strike" hit approximately 200 m from the big mosque. It is unclear whether this testimony refers specifically to the first or the second impact location.

Location No. 1

17. Two videos handed over by a witness (v02 and v03) show an impact site in a courtyard. In one of the videos, a tablet is shown displaying a Global Positioning System (GPS) application with the coordinates N35.6408333° E36.7426167°, approximately 140 m north-east of the mosque.

Location No. 2

18. The same videos (v02 and v03) show the impact location at a house. The coordinates displayed on the tablet are N35.6405500° E36.7418833°, approximately 75 m north-north-east of the mosque and approximately 75 m south-west of location No. 1.

19. The metadata of the videos do not contain GPS coordinates. A visual comparison of images and satellite pictures carried out by an external forensic institute strongly supports that the GPS coordinates displayed in the videos are indeed the sites depicted in them (error of 4-8 m). It is cautioned, however, that higher-resolution satellite images or other reference images could corroborate the findings, but could also theoretically have another outcome.

20. The Government provided the name of the owner of the house targeted in the attack by armed opposition groups that it described. The name corresponds to the name of the owner of the house at location No. 2. While the Government had stated that the person had died in the attack, the person was interviewed by the fact-finding mission several months later.

Munition

21. The fact-finding mission quoted witnesses as describing the sound of the falling munition as "whistling". Upon impact, a witness heard a muted, distinct sound, as though there were no explosion or one with very low impact.

Location No. 1

22. Videos v02 and v03, taken two days after the impact, show a crater in a backyard, but no remnants. A person is seen taking measurements of the crater (300 cm in diameter and 100 cm in depth), as referred to in the fact-finding mission report (S/2015/138).

23. A forensic examination of videos v02 and v03 concluded that "[the] detonation site [was] questionable in terms of showing an alleged site for a barrel bomb strike with toxic chemicals". A barrel bomb without a large explosive charge would not penetrate the hard soil to the extent seen. The expert analysis further excludes the use of a barrel bomb with explosives or other munition, given that no traces of shrapnel hits are visible in the surrounding walls and a barrel bomb with corresponding explosive content would cause surrounding walls to collapse. A mortar round, artillery shell or a bomb may have caused a detonation pit of a similar size, but there would, most likely, also be traces of shrapnel hits in the surrounding walls and partially or fully collapsed walls owing to the damage effect caused by the detonation.

24. According to the forensic expert analysis, the crater ("pit") in videos v02 and v03 was caused by a detonation, but the origin of the detonation was probably an explosive charge of 5 to 10 kg TNT-equivalent buried in the ground.

25. A video (v04) by local media shows the same courtyard and crater. There appears to be a cylinder inside containing the deformed remains of the outer jacket of a "barrel bomb", which is lying next to a crater in the courtyard. Forensic examination and image comparison strongly supported the assertion that this video showed the same backyard with a crater (location No. 1) as videos v02 and v03. Dead animals are seen next to the crater. The metadata of video v04 include timestamps that indicate 20 April 2014 as the creation date, one day before the incident. It is noted, however, that metadata depend on the settings of the recording device used and can be altered.

26. The analysis of video v04 did not change the analysis of the crater above. It is further stated in the forensic report that the remnants seen in video v04 are not likely to have been the carrier of the explosives that caused the crater ("pit"), given that the device would have fragmented at the top and sides, dispersing into smaller pieces, just as the remnants in video v04. The munition would have carried only a small amount of explosives and could not have caused a crater of such size. In addition, the bodies of the dead animals seen in video v04 look clean and intact, making it highly unlikely that they were in the backyard or in the close vicinity when the device causing the crater detonated.

27. Another video (v05) provided a witness depicting the same courtyard, but had to be disregarded because it had signs of heavy editing.

28. As a result of the inconsistencies, location No. 1 was disregarded for further investigation.

Location No. 2

29. Video v02 shows the remnants of a barrel bomb that impacted the outside kitchen structure of a house. The remnants of the outer jacket are deformed. The remains of an inner cylinder, which has been split at the bottom, can be seen lying adjacent to the remnants of the outer jacket. This split is considered to have been caused by either a kinetic or an explosive force. The measurements of the inner cylinder are approximately 100 cm in length and 40 cm in diameter. The inner cylinder has a main valve at the centre on top and a safety valve, also on top, but offset from the centre. The main valve is broken off. Given that video v02 was taken two days after the incident, the remnants may have been moved from the initial point of impact.

30. Samples taken two days after the event at location No. 2 were provided to an international newspaper. The results of a sample analysis were published on 29 April 2014, stating that soil samples from Kafr Zita and Talmenes "were found by a chemical warfare expert to contain traces of chlorine and ammonia". A witness indicated that the samples had been analysed by an independent expert, but the details of the analysis and the chain of custody for the samples have not been established.

31. Another source had collected samples "in Talmenes at the end of April". This source shared its analysis results, stating that chlorinated compounds and traces of TNT had been found in the soil and gravel. The source cautioned, however, that it had no scientific evidence of the use of chlorine.

32. Another witness mentioned the presence of a likely foreign non-governmental organization that also took samples. The Mechanism did not have direct access to those samples.

33. The Government stated that the munition had been launched from a land-based delivery system and did not contain chemicals. The Government provided a picture of the type of munition supposedly used at location No. 2. That munition has a number of significant differences compared with the remnants seen in the other pictures and videos relating to location No. 2. It is rocket-propelled, with at least eight fins. No remnants of this kind were documented at the site.

Delivery method

34. Three witnesses stated that they had seen a helicopter approaching Talmenes on 21 April 2014 between 1000 and 1100 hours, carrying munitions on external platforms that they described as "wings".

35. In a video (v06) provided by a witness, a person reports having seen an aircraft flying right over the minaret of the mosque. First, it turned east, but then, suddenly, it attacked. This was followed by an explosion that was not very strong.

36. In the same video, another person claimed to have seen an aircraft right over the minaret of the mosque dropping a bomb.

37. Another witness indicated having heard an aircraft at around 1030 hours and seen a helicopter flying over the village. A detonation occurred approximately 30 minutes later and a cloud of yellow smoke emerged, causing panic among the population.

38. Other sources provided their assessment that overflights had occurred on 21 April 2014. There are indications that a helicopter took off from Hama airbase at around 1030 hours, was spotted flying over several villages on the way to Talmenes and allegedly dropped two devices over Talmenes at around 1100 hours.

39. The Government stated that the impact had been caused by a land-based projectile launched by an armed opposition group from the vicinity of Ma'ar Shamarin, approximately 3 km from the point of impact.

Damage and effects

40. Three witnesses described a yellowish cloud of 50 to 75 m in height, "shaped like a tree". The cloud settled at a height of some 1 to 1.5 m above the ground, over 200 m towards the east in the direction of the wind. People were affected as far as 1 to 1.5 km downwind.

41. According to the fact-finding mission, all witnesses described the smell as pungent, irritating and "of chlorine", or similar to household cleaning agents, but much more intense.

Location No. 2

42. The videos from this impact location (v02) show much destruction and damage to the structure of the house. The munition is understood to have impacted a concrete block building and resulted in extensive damage to the structure. Large quantities of rubble and other building debris are visible. As a result, there is no clear view of the crater, although a crater-like structure is visible. The video shows yellowing leaves on the trees and dead leaves on the ground.

43. The forensic analysis of the destruction indicates that the structural damage to the building may have been caused by the detonation of a barrel bomb. The large size of the remnants, it is argued, would indicate that either the device contained explosives that did not detonate or that it contained only a small amount of explosives.

44. The rocket-propelled munition type indicated by the Government is, according to munitions experts, almost certainly a conventional high-explosive type. Such an amount of explosives, estimated to be at least 200 kg, would have entirely destroyed the house at location No. 2 and possibly a number of surrounding buildings. The damage seen in the available pictures and footage of location No. 2 is inconsistent with this assessment.

45. One witness referred to animals that had died when the barrel bomb hit at location No. 2. Another witness reported that the pepper plants in the garden had turned yellow and half of them had dried out.

Medical effects

46. A witness stated that 200 people had been affected by the use of chemicals, many of whom had been transferred to other hospitals. Another produced a list of 133 patients registered at Talmenes hospital on 21 April 2014, on the basis of the information provided by another witness, and also provided four photographs of severely affected patients. The number of injured people in Talmenes was confirmed

by another source. Another witness confirmed that 150 patients from Talmenes had been received at Jarjanaz hospital that day.

47. Video v06 concludes with chaotic scenes in what appears to be Talmenes hospital. It includes interviews with people identified as hospital staff, one of whom stated that the number of casualties from 21 April 2014 had gone up to 400, although the time frame is unclear.

48. Video v06 also includes testimony from those who lived in the two houses impacted (locations Nos. 1 and 2). Family members reported suffering from choking and heavy coughing, unconsciousness and vomiting blood. One mother described skin irritation after touching her affected daughter. A young boy had blood and foam coming from his mouth.

49. Three persons are reported to have died after referral to other hospitals in a neighbouring country. The "death certificate" of one of the victims at location No. 2, issued on 25 April 2014, has been obtained by the Mechanism. It does not, however, include the cause of death. The autopsy report also does not provide the cause of death.

50. People used the usual escape route in case of air strikes, eastward into a low-lying olive ground. The wind was blowing from west to east at 3 m/s; according to data from the World Meteorological Organization, the direction of the dispersion of the plume is credible. Two external sources provided their results of a chlorine dispersion plume analysis, stating that it was feasible that a chlorine barrel bomb could have affected 200 people, most of them mildly.

51. The Government indicated that the main impact of the explosion had been the destruction of a structure at location No. 2, which had killed the owner (name provided) and his child. A witness interviewed by the fact-finding mission, however, later identified himself as the owner of the house and father of the child.

52. The launch of a projectile from the ground would not explain the 200 to 300 victims suffering from chlorine exposure. The Government stated its belief that the number of victims was incorrect. According to a witness, armed opposition fighters spread information about the use of chemicals after the explosion, causing panic among the population. The same people also provided face masks to people and told them to leave the village. Notwithstanding a smell of "rotten eggs", the witness felt no symptoms and saw no injured people, just those in a state of panic. The witness attempted to enter the hospital, but was denied access. The same witness stated that people referred to other hospitals had returned to the town two days later with no visible signs of injuries.

53. The description of the effect on the population, who were evacuated from the town after an air strike and caught up in a toxic plume, is consistent with a plume dispersion analysis carried out by two Member States and the weather information received from the World Meteorological Organization. While the exact number of patients could not be definitively established, it is obvious that large numbers of people were affected by toxic chemicals. Several sources shared their analysis of soil samples, which indicated the presence of chlorinated compounds.

54. The structural damage at location No. 2 could result from the detonation of a barrel bomb, but not from a conventional high-explosive type munition. The remnants documented at the location resemble those of barrel bombs, with remnants

of an inner cylinder and an outer jacket. No remnants of a rocket-propelled munition were documented at the site. Witness statements provide a clear link between an explosion, the smell of chlorine, a cloud and the effect on the population.

55. Witnesses and other sources provided information indicating that a helicopter or helicopters were present; some said that the helicopters had delivered the munition. Only one witness appears to have actually seen a device falling. The testimony of other witnesses and persons interviewed in videos that were provided to the Mechanism differ in their description of the time lapse between observing the "aircraft" and the explosion.

Leadership Panel's assessment

56. The Leadership Panel examined the existing information regarding the two impact locations in Talmenes on 21 April 2014. There is sufficient information for the Panel to conclude that the incident at impact location No. 2 was caused by a Syrian Arab Armed Forces helicopter dropping a device causing damage to the structure of a concrete block building and was followed by the release of a toxic substance that affected the population.

57. This conclusion was based on the following:

- Ahrar al-Sham and the Nusrah Front had a heavy presence around Talmenes. Both were said to have been in control of the town. Talmenes was subject to regular artillery and air force attacks around and on 21 April 2014. On that day there was an ongoing battle between government forces and armed opposition groups, as well as the Nusrah Front, around the two military bases at Wadi Deif and Hamidiyah, both of which are in close proximity to Talmenes.
- Witnesses stated that the release of toxic chemicals followed the explosion of a barrel bomb dropped from an aircraft.
- Both the Government and the armed opposition groups do not deny that chlorine was used in Talmenes on 21 April 2014.
- The Government stated that the impact (location No. 2) was caused by a land-based projectile launched by an armed opposition group. The structural damage was not found to be consistent with this.
- Only one of the two alleged impact sites (location No. 2) has been found plausible by the Mechanism.
- When the incident occurred, the Government had lost control of six airbases, including Taftanaz airbase (Idlib governorate). The Government informed the Mechanism that 15 helicopters had been left behind at Taftanaz airbase, 9 of which had been deemed operational.
- The Leadership Panel reviewed all the information gathered and found no evidence that armed opposition groups in Talmenes had been operating a helicopter at the time and location of the incident.
- While the exact number of patients could not be definitively established, it is obvious that large numbers of people were affected by toxic chemicals.

Annex V

Al-Tamanah, 29 and 30 April 2014

Findings of the fact-finding mission

1. The fact-finding mission reached the following conclusion with regard to the information collected:

> This constitutes a compelling confirmation that a toxic chemical was used as a weapon, systematically and repeatedly, in the villages of Talm[e]nes, Al-Tamanah, and Kafr Z[i]ta in northern Syria. The descriptions, physical properties, behaviour of the gas, and signs and symptoms resulting from exposure, as well as the response of the patients to the treatment, leads the fact-finding mission to conclude, with a high degree of confidence, that chlorine, either pure or in mixture, is the toxic chemical in question.[1]

2. The mission further stated:

> The dates recounted are 12, 18, and 30 April 2014, and 22 and 25 May 2014. All attacks, except the one of 22 May 2014, occurred at night. These attacks resulted in more than 150 casualties, and eight of the most severely affected, mostly women and children, died from exposure to lethal doses of the toxic chemical.[2]

3. Among the five dates that the witnesses recalled was an incident during the night of 29-30 April that resulted in 35 casualties.[3]

Mechanism's investigation

Background

4. Al-Tamanah (Idlib governorate, Ma'arrat al-Nu'man district) is located less than 9 km east of the M5 motorway, running from Damascus to Aleppo, on the section between the cities of Hama and Idlib. The fact-finding mission reported that, in 2014, approximately 20,000 inhabitants were living in the vicinity of Al-Tamanah, compared with the 7,385 in the town and 29,144 in the subdistrict recorded in the census conducted in 2004. This included between 5,000 and 10,000 internally displaced persons. According to a report of the Office for the Coordination of Humanitarian Affairs, 5,500 internally displaced persons were in need of humanitarian assistance in the subdistrict in August 2014.

5. At the time of the incidents, Al-Tamanah was in immediate proximity to the front line. While several armed opposition groups operated in the vicinity, the Government held checkpoints and bases along the M5 motorway and in Khan Shaykhun to the west of Al-Tamanah.

6. The first half of 2014 in Idlib saw clashes between the Government and armed opposition groups around the M5 motorway. The groups were aiming at — and partly succeeding in — opening their access to Idlib city and cutting the

[1] See S/2015/138, enclosure III, annex 2, para. 29.
[2] See ibid., para. 10.
[3] See ibid., enclosure IV, annex 2, table 4.

Government's supply to its military bases. Murak, approximately 10 km to the south-south-west of Al-Tamanah, had been captured by armed opposition groups in February 2014 and reportedly recaptured by government forces on 14 April 2014.

7. In March and April 2014, armed opposition group operations were concentrated on capturing checkpoints along the M5 motorway between Murak, Khan Shaykhun and Ma'arrat al-Nu'man. It appears that different armed opposition groups were joining forces and dividing "responsibility" for the checkpoints among them. The Government sought to maintain access to the motorway, while also establishing alternative routes to Aleppo and Idlib city.

8. Early in 2014, Al-Tamanah was used as a "collective operational base" by several armed opposition groups. Security Council-designated terrorist organizations,[4] such as the Nusrah Front, and those affiliated therewith were also present. Witnesses also referred to the presence of Islamic State in Iraq and the Levant (ISIL) in Al-Tamanah; however, following clashes with the Nusrah Front and armed opposition groups, ISIL largely retreated from Idlib in March 2014.

9. Several other armed opposition groups had a presence and operations in the area, but the period was characterized by a high volatility of conflict dynamics and armed opposition group locations, alliances and spheres of influence.

10. One of the more influential armed opposition groups was reportedly the Idlib Military Council, part of Jabhat Thuwar Suriyah since December 2013. There are contradicting statements regarding the presence of other armed opposition groups at the time of the incidents. While some sources report that Jaysh al-Izzah, an alliance of several groups formed in 2014, was temporarily headquartered in Al-Tamanah, other sources do not confirm this. Witnesses indicated that Ahrar al-Sham had a presence there as well, but its representatives did not confirm this.

11. Two health facilities in Al-Tamanah have been mentioned by witnesses in relation to the incidents under investigation: the Hanin medical charity/point and the ninth medical point. In open sources and media reports about patients suffering from exposure to chlorine, the Hanin medical point and a medical field facility can be seen. The Hanin medical point is funded by donations, without the consent of the Government. Owing to its limited capacity, severely injured people are often referred to other hospitals.

Narratives

12. There are different descriptions of the events in Al-Tamanah. The description that emerged from the testimony of the fact-finding mission witnesses was that, during the night of 29-30 April 2014, an alert was issued by a flight monitoring observatory of helicopters approaching and potentially bringing chlorine bombs. Two barrel bombs were dropped and 35 patients sought medical attention with symptoms relating to chlorine exposure. According to the witnesses, Al-Tamanah was attacked five times with barrel bombs possibly containing chlorine dropped from helicopters in April and May 2014.

13. The Government denies any military activity by its forces in Al-Tamanah on that date and provided information to show that the events had been fabricated. In

[4] On 30 May 2013, Islamic State in Iraq and the Levant and the Nusrah Front were designated as terrorist groups by the Security Council in accordance with resolution 1267 (1999).

that regard, seven witnesses stated that frequent alerts had been issued, but in fact no incidents with chemicals had taken place. While people sought safety after the warnings, their homes were looted and rumours spread that the events were being staged.

14. On the basis of witness statements, the Mechanism assessed the possibility that a conventional air strike or attack had taken place and the chemical exposure had been wrongly attributed to it. No air activity could be established, however. The witness testimony of air strikes did not specify a date and the description as such could not be linked to the incident of the night of 29-30 April 2014. Hence, this possibility was disregarded.

15. Several witnesses gave testimony of repeated air strikes around or on the dates of the incidents in Al-Tamanah. Information and statistics available to and analysed by the Mechanism did not contain specific data on air strikes in the town that would have established a more accurate picture of the conflict dynamics in the immediate vicinity at the time. The Government stated that no military activities had been conducted from land or the air in Al-Tamanah on the dates of the incidents, but did not provide records of flight operations to support its statement.

Date and time

16. Most of the witnesses were interviewed several months after the alleged incidents. Owing to the frequency of alerts and incidents relating to military activity, their memory of the events might have become blurred. Most of them did not give specific dates, but referred to several incidents in a time frame between March and June 2014.

17. Only one witness specifically referred to the incident on the night of 29-30 April 2014, but did not provide a specific time. That witness said that four people had died in the incident and did not mention a second impact location.

18. Three witnesses, who gave no description of the incident on the night of 29-30 April 2014, provided material of unknown provenance. One had second-hand knowledge of two of the five incidents in Al-Tamanah, but did not remember the exact dates. Later, that witness provided a USB stick with information of unknown provenance, which was saved in separate folders according to the dates of all the five incidents mentioned by the fact-finding mission. Another witness provided the dates of all five incidents, reading from a piece of paper, but provided no testimony regarding the incident on the night of 29-30 April 2014. The latter also provided a video entitled "site where second barrel containing toxic chlorine gas was dropped tamanaa 30 April 14".

19. Several media reports quoted "local activists" as saying that one or several helicopters had dropped "two bombs laden with gas" or "explosive devices containing chlorine" on the town of Al-Tamanah in the early hours of the morning of 30 April 2014. Several open-source videos show patients being treated in what appears to be the Hanin medical point and a field medical facility.

20. Several witnesses stated that chemical weapon alerts through the media or the local early warning systems had been occurring frequently at non-regular intervals since April or May 2014. Although the majority of witnesses referred to the alerts issued by a "flight observatory", the exact dates of the warnings remained unclear.

21. Seven witnesses stated that, after several alerts, no attack had actually occurred and that they had come forward to contest the widespread false media reports. The alerts, they said, had been false alarms and toxic chemicals had never been used in Al-Tamanah. It remained unclear how they could make such exclusive statements for the entire town at any time. Some of the witnesses stated that, after the false alerts, the houses of those who had evacuated had been looted.

22. When interviewed a second time, two of those witnesses described air strikes in Al-Tamanah in or at the end of April 2014, which they had not mentioned previously, but said that chemicals had not been involved in any of the attacks. Although no specific dates were given, the Mechanism investigated the possibility that the statements referred to the incident on the night of 29-30 April 2014, but could not find supporting links.

Weather conditions

23. During the night of 29-30 April 2014, between 2000 and 0100 hours, the wind came from the west (260°-300°) and the wind speed fell from 4 to 2 m/s. For the rest of the night, the wind speed came from various directions at a speed that fell from 4 to 2 m/s. From 2000 to 0600 hours, the temperature dropped gradually from 18°C to 13°C and the relative humidity increased from 82 per cent at 2000 hours to 93 per cent at 0600 hours.

Impact location

Location No. 1

24. The Mechanism endeavoured to establish the location of the impact at a residential house in the north of Al-Tamanah. The exact location was not given and could not be determined from the descriptions and reference points given by the witnesses. No public satellite imagery was available for the time and location in question. Repeated requests notwithstanding, no military satellite imagery was made available to the Mechanism.

25. All footage provided by witnesses showed the interior of the Hanin medical point, but not the surrounding area. Two videos (open source) show an impact location between houses that appear uninhabited. The videos do not show enough of the surroundings to establish the exact impact location.

Location No. 2

26. Another video (available from open sources), provided to the Mechanism by several sources, shows remnants in an open field. An additional video provided by a witness shows an impact location in an open field with what looks like the remnants of a munition. The impact location is next to an unpaved road. Houses that appear uninhabited, some of which are damaged, can be seen in the vicinity. The video does not show enough of the surroundings to establish the exact impact location.

Munition

Location No. 1

27. The Mechanism did not obtain any parts, samples or imagery (photographs or videos) of the munition or its remnants at location No. 1. Some remnant fragments

can be observed in the videos mentioned previously, but not enough to allow for sufficient analysis.

28. The witness described the impact of a barrel and subsequent explosion, as observed from a roof, as follows: "A flame or fire or something yellow went 20-25 m up in the air and disappeared immediately". This is understood to refer to location No. 1. The witness did not mention a second impact and stated that four people had died in the attack, although no deaths were established by the fact-finding mission in the incident. The witness had no mask and therefore was unable to go to the impact location. The witness neither mentioned the smell of chlorine nor was aware of a chemical alert.

Location No. 2

29. The Mechanism did not obtain any parts or samples of the munition or its remnants at location No. 2. The remnants in the video of location No. 2 could be interpreted as the remnants of a barrel bomb. Only parts of the outer jacket can be seen, however, not allowing for a definite analysis. In the absence of sufficient footage or any description of the remnants, the Mechanism endeavoured to draw conclusions on the munition from the description of the impact.

30. The Government provided information that on 30 April 2014 a device left by an armed opposition group exploded on an agricultural road west of Al-Tamanah, leading to the death of a citizen. The Mechanism investigated potential links to location No. 2, but could not find further information to support this.

Delivery method

31. Repeated requests notwithstanding, none of the Mechanism's sources provided information, affirmative or negative, regarding air movements on the night of 29-30 April 2014. Only the Government provided information and stated that it had had no military activities on land or in the air in Al-Tamanah on the date in question. Witness statements about air strikes around the time could not be linked to the specific night.

Location No. 1

32. The eyewitness, who reported having been on the roof, claimed to have heard a helicopter and the "very loud" sound of a falling barrel. Some interviewees had referred to a distinct whistling sound made by falling barrels containing chlorine. The witness statement could not be corroborated by further information.

Location No. 2

33. No witness statement or information was available to either confirm the claim that a second barrel bomb had been dropped from a helicopter or that an improvised explosive device had exploded.

Damage and effects

Location No. 1

34. According to the eyewitness, the building was almost entirely destroyed, with only two walls left standing. The surrounding area was also affected. The two videos mentioned above also show a high level of destruction.

35. The Government put forward its analysis of the two videos, concluding that the destruction was a result of a conventional munition rather than a chemical munition.

36. The Mechanism requested a forensic examination from an independent institute. The findings were inconclusive. A shallow "hole" can be seen; it might have been the result of a conventional barrel bomb with explosives, but an impact from a chemical barrel bomb could not be excluded.

37. Additional open-source videos allegedly relate to the incident. Two were considered to show location No. 1. Parts of a destroyed house can be seen, together with a crater and what may be remnants of munition. It could not be determined, however, whether those munition parts were linked to the impact. The videos do not show enough of the surrounding areas to determine the potential environmental impact.

38. The description of the impact by the witness, in addition to the destruction seen in the videos, points to the use of a conventional munition (air or land) rather than to the use of a barrel bomb filled with chlorine, which would have a small explosive charge. The information available, however, is not enough to conduct a thorough analysis.

Location No. 2

39. The videos do not show a crater or other signs of impact of the remnants.

Medical effects

40. The fact-finding mission describes the medical symptoms of patients for all five incidents in summary. For the incident on the night of 29-30 April 2014, the mission reported 35 patients. A witness who provided the dates, number of patients and number of deaths for each of the five incidents did so while reading from a piece of paper.

41. The eyewitness to the explosion relating to location No. 1 stated that 4 people had died and 70 had been injured in the incident, while the fact-finding mission had established only 35 patients and no deaths. Some media reports also referred to 70 people being affected by the use of chlorine as a weapon.

42. An independent source provided a list of unknown origin with the names of 12 people injured by chlorine gas on 29 April 2014. No medical records have been received from the Hanin medical point, repeated requests notwithstanding. The Mechanism requested medical documentation from referral hospitals, but received no information relevant to the date and incident in question.

43. Videos retrieved from open sources and from a witness, respectively, show patients being treated at the Hanin medical point and at a medical field facility. The analysis of the videos did not, however, provide additional and verifiable

information on the alleged impact site or delivery methods. For that reason, no further forensic analysis was undertaken.

44. Some of the witnesses stated that "nothing had happened" in Al-Tamanah and said that they had seen no patients suffering from chemical exposure. These witnesses, however, are not considered to be in a position to make definitive statements for the entire town.

45. Neither the impact location nor the population density of the impact area is known. In addition, many people left the village upon the issuance of a chemical weapon alert. Accordingly, insufficient data were available to apply chlorine dispersion models.

Further information

46. The incident received broad media coverage. Some international media reported that the Government had used barrel bombs containing toxic chemicals.

47. Several witnesses reported that local responders (sometimes specified as "white helmets") had established basic early warning systems through local media, volunteers, hand-held radios and mosques. After the first chemical attacks, they had provided information about recommended behaviour in the event of air strikes and chemical attacks. In the event of chemical alerts, people were encouraged to move upwind of the point of impact to higher elevations, while in the event of conventional attacks people were advised to seek shelter in basements.

48. Six witnesses stated that people had left the village and that, during the evacuation, after what they said had been false alarms, their own or their neighbours' houses had been looted. Some referred to people with "masks", potentially gas masks, giving face masks soaked in "Coca-Cola" or "Pepsi" to children. Two witnesses referred to rumours in the town of people trying to "blame" the Government or stage the incidents.

49. A witness described an air strike on the house of an armed opposition group fighter "at the end of April". The next day, people wearing masks were "digging something out of the ground" and filming the scene, saying that Al-Tamanah had been hit with toxic chlorine gas. The witness did not smell gas or see injured people, however. When interviewed previously, the witness had not mentioned the incident.

50. Some of the witnesses said that armed men, some of them from Al-Tamanah and some foreigners, had been issuing false chemical alarms and saying that the government forces would attack the village with chemicals, sometimes specifying chlorine, and telling people to leave the village. The alerts were issued in various ways, from vehicles and mosques using microphones and loudspeakers or simply in person. Two witnesses mentioned the same person who was allegedly filming the "staged" scenarios.

51. One witness said that people had been knocking on the door. People on motorcycles and in cars had told people to leave their houses because an aeroplane was going to attack. Children of various ages had been running after them. Apparently the people, whom the witness believes to belong to the Nusrah Front, had gone to the school, taken the children out and given them diapers soaked with a liquid in order to use as gas masks, claiming that chlorine would be used in the air

strike. The witness stayed at home, despite the warning, and smelled and saw nothing.

Leadership Panel's assessment

52. The Leadership Panel determined that there was insufficient information to confirm or to exclude the possibility of a chemical attack and that there was contradictory and insufficient evidence to draw a conclusion on the actors involved.

53. This assessment was based on the following:

- There is scarce relevant information about all incidents in Al-Tamanah. No flight movements could be established by the Mechanism.
- There are discrepancies in the statements made by witnesses and the descriptions of the event are inconsistent. On the one hand, some witnesses described people affected by the use of chlorine as a weapon. On the other hand, other witnesses described air strikes in Al-Tamanah in or at the end of April 2014 and stated that chemicals had not been involved in any of the attacks.
- This incident has been considered by experts to stem from an attack with conventional munitions.

Annex VI

Al-Tamanah, 25 and 26 May 2014

Findings of the fact-finding mission

1. The fact-finding mission reached the following conclusion with regard to the information collected:

> This constitutes a compelling confirmation that a toxic chemical was used as a weapon, systematically and repeatedly, in the villages of Talm[e]nes, Al-Tamanah, and Kafr Z[i]ta in northern Syria. The descriptions, physical properties, behaviour of the gas, and signs and symptoms resulting from exposure, as well as the response of the patients to the treatment, leads the fact-finding mission to conclude, with a high degree of confidence, that chlorine, either pure or in mixture, is the toxic chemical in question.[1]

2. The mission further stated: "The dates recounted are 12, 18 and 30 April 2014, and 22 and 25 May 2014. All attacks, except the one of 22 May 2014, occurred at night."[2]

3. Among the five dates that the witnesses recalled was an incident during the night of 25-26 May 2014 that resulted in no casualties.[3]

Mechanism's investigation

Background

4. Al-Tamanah (Idlib governorate, Ma'arrat al-Nu'man district) is located less than 9 km east of the M5 motorway, running from Damascus to Aleppo, on the section between the cities of Hama and Idlib. The fact-finding mission reported that, in 2014, approximately 20,000 inhabitants were living in the vicinity of Al-Tamanah, compared with the 7,385 in the town and 29,144 in the subdistrict recorded in the census conducted in 2004. This included between 5,000 and 10,000 internally displaced persons. According to a report of the Office for the Coordination of Humanitarian Affairs, 5,500 internally displaced persons were in need of humanitarian assistance in the subdistrict in August 2014.

5. At the time of the incidents, Al-Tamanah was in immediate proximity to the front line. While several armed opposition groups operated in the vicinity, the Government held checkpoints and bases along the M5 motorway and in Khan Shaykhun to the west of Al-Tamanah.

6. The first half of 2014 in Idlib saw clashes between the Government and armed opposition groups around the M5 motorway. The groups were aiming at — and partly succeeding in — opening their access to Idlib city and cutting the Government's supply to its military bases. Murak, approximately 10 km to the south-south-west of Al-Tamanah, had been captured by armed opposition groups in February 2014 and reportedly recaptured by government forces on 14 April 2014.

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[1] See S/2015/138, enclosure III, annex 2, para. 29.
[2] See ibid., para. 10.
[3] See ibid., enclosure IV, annex 2, table 4.

7. In March and April 2014, armed opposition group operations concentrated on capturing checkpoints along the M5 motorway between Murak, Khan Shaykhun and Ma'arrat al-Nu'man. It appears that different armed opposition groups were joining forces and dividing "responsibility" for the checkpoints among them. The Government sought to maintain access to the motorway, while also establishing alternative routes to Aleppo and Idlib city.

8. Several witnesses gave testimony of repeated air strikes around or on the dates of the incidents in Al-Tamanah. Information and statistics available to and analysed by the Mechanism did not contain specific data on air strikes in the town to establish a more accurate picture of the conflict dynamics in the immediate vicinity at that time. The Government stated that it had not conducted military activities from land or the air in Al-Tamanah on the dates of the incidents.

9. In the first half of 2014, Al-Tamanah was reportedly being used as a "collective operational base" by several armed opposition groups. Witnesses also referred to the presence of Islamic State in Iraq and the Levant (ISIL)[4] in Al-Tamanah; however, following clashes with the Nusrah Front and armed opposition groups, ISIL largely retreated from Idlib in March 2014.

10. Several armed opposition groups had a presence and operations in the area, but, owing to the high volatility of conflict dynamics, their locations and alliances (in addition to contradicting reports, most of which do not have the level of detail required), the exact locations and spheres of influence at the date and locations investigated cannot be established with certainty.

11. One of the more influential armed opposition groups was reportedly the Idlib Military Council, part of Jabhat Thuwar Suriyah since December 2013. There are contradicting statements regarding the presence of other armed opposition groups at the time of the incidents. While some sources report that Jaysh al-Izzah, an alliance of several groups formed in 2014, was temporarily headquartered in Al-Tamanah, other sources do not confirm this. Witnesses indicated that Ahrar al-Sham had a presence there as well, but its representatives did not confirm this.

12. Two health facilities in Al-Tamanah have been mentioned by witnesses in relation to the incidents under investigation: the Hanin medical charity/point and the ninth medical point. In open sources and media reports about patients suffering from exposure to chlorine, the Hanin medical point and a medical field facility can be seen. The Hanin medical point is funded by donations, without the consent of the Government. Owing to its limited capacity, severely injured people are often referred to other hospitals.

Narratives

13. The description that emerged from the testimony of the fact-finding mission witnesses was that, on the night of 25-26 May 2014, two barrel bombs were dropped over Al-Tamanah. One failed to explode (location No. 1), but the impact opened a cylinder inside the barrel, which leaked chlorine. The unexploded barrel was found in the morning. The other exploded (location No. 2), but nobody was affected because it fell in an uninhabited area of the village.

[4] On 30 May 2013, Islamic State in Iraq and the Levant and the Nusrah Front were designated as terrorist groups by the Security Council in accordance with resolution 1267 (1999).

14. Similarly to the incident on the night of 29-30 April 2014, the Government denied any military activity by its forces in Al-Tamanah on 25 and 26 May and provided information to show that the events had been fabricated. In that regard, other witnesses stated that frequent alerts had been issued but in fact no incidents with chemicals had taken place, and while people had sought safety after the warnings their homes had been looted. Witnesses stated that they had heard rumours that the events were being staged.

Date and time

15. Most of the witnesses did not give specific dates, but referred to several incidents between March and July 2014. Only one witness specifically recalled the date of 25 and 26 May 2014. The same witness reported having helped to dismantle the munition the following day and noticed a strong smell of chlorine. That witness also provided five videos of the excavation of the munition, in addition to five pictures of the remnants in a courtyard.

16. Another witness gave a summary of an event that resembled the description of the first witness and likely referred to the same incident, without recalling the exact date, and said that the event had occurred at around 2300 hours. The interviewee was among a group of people who found the unexploded munition the following morning.

17. A third witness described second-hand knowledge of an incident in which a barrel bomb had failed to explode but had leaked gas.

18. One witness had second-hand knowledge of two of the five incidents in Al-Tamanah. The witness did not remember the exact dates, but later provided a USB stick with information, which was saved in separate folders according to the dates of all the five incidents mentioned by the fact-finding mission. The folder labelled "صور البرميل 25-5-2014" contained four pictures and a video of the munition in a courtyard. This witness did not refer to this incident during the interview.

19. Another witness provided the dates of all five incidents, reading from a piece of paper, but provided no testimony relating to the incident on the night of 25-26 May 2014.

20. Seven witnesses from Al-Tamanah said that, since April 2014, "false" chemical weapons alerts had occurred frequently at non-regular intervals. Several of them stated that no chemical weapons had ever been used in Al-Tamanah.

Weather conditions

21. On the night of 25-26 May 2014, between 2000 and 0500 hours, the wind came from the west (280°) at a speed between 3 and 2 m/s (3 m/s at 2000 hours). The temperature dropped gradually from 22°C to 15°C and the relative humidity increased from 79 per cent at 2000 hours to 89 per cent at 0500 hours.

Impact location

22. The witness who gave testimony resembling the events on the night of 25-26 May without recalling the date drew a map of the impact location. Owing to the lack of detail and reference points, however, it did not help to determine the location. Another witness drew a map of four impact locations in Al-Tamanah and

numbered them 1, 2, 3 and 5, but it is unclear which impact location from the drawing correlates to which incident.

Location No. 1

23. The exact impact location of the barrel that failed to explode could not be determined from the witness statements or the footage provided. Four videos showed this impact location (videos v01-v04). All four are filmed in close-up and the surroundings cannot be seen. The videos were not forensically examined.

24. A witness stated that an unexploded barrel had fallen on a house and mentioned the name of the owner. The exact location of the house could not be determined. No public satellite imagery of the time frame in question was available to find a potential crater or impact. No military satellite imagery has been made available to the Mechanism, repeated requests notwithstanding.

Location No. 2

25. The witness who helped to evacuate the unexploded munition and recalled the exact date stated that another barrel bomb had exploded but fallen on a house in an uninhabited area. This witness also provided a video of the impact location. Another witness also provided a video of that impact location. While the two videos are filmed from different angles and have different lengths, they show the same scene. Not enough of the surrounding area can be seen to help to determine the coordinates of the impact location. The witness who helped to excavate the munition at impact location No. 1 but did not remember the exact date mentioned the impact in an uninhabited area too, and said that they had searched but could not find the impact location.

Munition

Location No. 1

26. The device at location No. 1 failed to explode. The witness who helped to excavate it and recalled the exact date provided four videos relating to impact location No. 1: video v01 shows the impact site; video v02, the dismantling of the barrel; video v03, the excavation; and video v04, the barrel being loaded on to a pickup. That witness also provided five pictures of the munition in a courtyard. Another witness could not remember the dates of the incidents and in the interview could not describe the incident on the night of 25-26 May 2014, but provided a USB stick that contained four pictures and a video of the munition in the same courtyard in a folder named "صور البرميل 25-5-2014".

27. The Mechanism could not independently verify the time and location of the videos and pictures, in particular because they had been shot up close and there was a lack of surroundings (i.e., no comparators to perform the analysis). The surroundings are not clearly visible in the footage.

28. Video v02 shows the unexploded barrel that looks as though it landed in a hole approximately 2.5 m deep, buried more than halfway in the soil with its fins up in the air (i.e., the rear end of the barrel). Two people are in the hole, dismantling the munition. Both, in addition to other people at the edge of the hole, have protective masks without canisters over their faces (i.e., those "gas masks" would be non-functioning). In addition, none of the people are wearing additional protective

gear such as gloves. During the entire dismantling process, the two people were not using any of the safety measures or equipment that would be required for the activity if hazardous substances were leaking in a confined space such as the hole.

29. From what can be seen, the unexploded barrel bomb consists of an outer barrel, an inner cylinder, powder that may be explosive and detonation cords. There appears to be a significant amount of the powdery substance between the inner cylinder and the outer barrel. The inner cylinder has two valves, one of which is wrapped in large quantities of detonation cord, fixed with tape. The detonation cords go from the valve of the inner cylinder towards the bottom part of the barrel. It cannot be said whether the inner cylinder is empty or filled. A piece of cloth and more of the powdery substance are between the outer barrel and the inner cylinder.

30. In video v03, the barrel is still in the position described above, but chains have been attached. Many people, including children, surround the hole, none of them wearing protective masks or gloves. The barrel is being dragged out of the ground and the hole. When the barrel is pulled out of the hole, the damage to the outer barrel can be seen at the rear end, where the fins are located. The bottom of the inner cylinder is also visible and no defects or ruptures can be seen.

31. Video v04 shows people dragging the barrel through a courtyard, up some stairs and loading it on to a pickup. No one is wearing any protection. Five pictures provided by this witness show the same munition in a tiled courtyard. It looks as though all the powdery substance has been removed, together with the detonation cords and pieces of cloth.

32. The witness who provided the videos described the munition as follows: "On the valve of the inner cylinder was a detonator, which looked like a blue rope or blue strain and goes around the valve to detonate it so the gas could come out; and a yellow-brownish powder (about 50 kg in total) was between the inner cylinder and the outer barrel and on the top of the inner cylinder. It is there to help with the explosion." The unexploded barrel was approximately 1.5 m in length and had a cover on the top and the bottom, held in place with screws. The barrel contained no markings and was locally made. The cylinder had numbers on the top, "maybe 976". This witness stated that the device had fallen and impacted with the tail part first, damaging the bottom of the cylinder, and demonstrated this with a self-made drawing. On the drawing, the tails and fins of the device are shown sticking in the ground. In the video that the same witness provided, however, the tail and fin parts are above the ground and the nose end impacted the ground first.

33. The munition in a tiled courtyard shown in the video and pictures provided by another witness matches that in the videos.

34. In an additional open-source video (v05), a person who is also seen in the videos discussed above stands next to what is assessed to be the same barrel. The person states that this was the fifth attack on Al-Tamanah with a barrel that contained a substance that they think is chlorine, but that the barrel did not explode when it fell on soft soil. The cylinder inside released the gas slowly over the course of at least three hours. Forensic examination found a time stamp indicating the uploading date of the video to YouTube as 29 May 2014 at 14:23:32 UTC, although it could also have been uploaded on 28 May, two to three days after the alleged incident. The analysis can neither establish the date on which the video was filmed nor give information on the location, however.

35. In none of the videos and pictures provided can a fuse or blasting cap be seen. It therefore cannot be determined from this material how this barrel bomb functioned. The covers on the top and the bottom mentioned by the witness, held in place with screws, were not seen in the videos or pictures.

36. Forensic examination of video v05 stated that the munition "seems to be of the same thin metal as seen before in other cases". According to the analysis, which is consistent with the Mechanism's assessment, the explosion of 50 kg of explosives would have destroyed (fragmented into small pieces) the outer jacket. The munition's effects on the surroundings would be more like those of a conventional munition rather than of a munition filled with chemicals. If this quantity of explosives detonated, and the inner cylinder had contained chlorine, the chlorine would likely be oxidized, which would greatly limit the effect of chlorine gas.

37. In addition, it is unclear when the gas leakage took place. The witnesses said that, upon arrival at the scene, they had had to get gas masks because the smell was too strong. The gas masks in the videos were missing filter canisters, however. It is unclear how long after the barrel was found that the dismantling, as seen in the video, began.

38. The forensic report also stated that it "is judged that the cylinder may leak gaseous substances for shorter or longer times than three hours depending of the content of the cylinder (pure gas, extent of mixing of chemicals) and the damage type and extent".

39. The Government provided its analysis of video v05, in which a person says that the cylinder leaked gas for three hours, stating that the gas in the inner cylinder would have been released in seconds owing to the pressure, volume, damage, temperature and impact strength. The Mechanism can neither accept nor reject this assessment, given that too little is known about the specifics of the container, the filling of the cylinder, the damage and the surroundings to exclude the possibility of a three-hour leaking process with certainty.

Location No. 2

40. According to a witness, the second barrel fell on an uninhabited house and exploded. The witness went to location No. 2 and smelled chlorine, but saw no remnants. Another witness stated that "they" had searched, but could not find the impact location. The videos from the location show what looks like remnants, but it cannot be said for sure.

Delivery method

41. The Government stated that it had had no military operations on land or in the air at the time of the incident. Repeated requests notwithstanding, none of the Mechanism's sources could provide information regarding air movements on the date in question, neither affirmative nor negative.

42. The witness who helped to excavate the munition said that, on 25 May 2014, two barrels had been dropped. In the open-source videos described above, the speaker refers to air strikes by the "Assad" forces.

Location No. 1

43. Forensic examination of the footage of the munition assessed that the existence of stabilizing fins pointed to the barrel bomb being constructed to be dropped from an aircraft. On hard soil, the penetration of the barrel into the ground after being dropped from a high altitude would be very limited and the damage to the barrel would be substantial, which is not the case with the barrel in the video. In soft soil, it could penetrate further and the impact could have affected the nose/front part of the barrel in such a way as seen on the barrel depicted in the video. A witness mentioned impact in "soft soil"; however, the condition of the soil could not be determined from the video analysis to assess whether the deep penetration of the barrel into the ground could have resulted from a high-altitude drop.

Location No. 2

44. There is no further specific information on location No. 2 with regard to the delivery method.

Damage and effects

Location No. 1

45. The barrel fell into a hole in the ground and failed to explode.

Location No. 2

46. The videos from this impact location show much destruction and damage to houses. No crater can be seen.

Medical effects

47. There were no medical effects.

Further information

48. The incident received broad media coverage. Some international media reported that the Government had used barrel bombs containing toxic chemicals.

49. Several witnesses reported that local responders (sometimes specified as "white helmets") had established basic early warning systems through local media, volunteers, hand-held radios and mosques. After the first chemical attacks, they had provided information about recommended behaviour in the event of air strikes and chemical attacks. In the event of chemical alerts, people were encouraged to move upwind of the point of impact to higher elevations, while in the event of conventional attacks people were advised to seek shelter in basements.

50. Six witnesses stated that people had left the village and that, during the evacuation, after what they said had been false alarms, their own or their neighbours' houses had been looted. Some referred to people with "masks", potentially gas masks, giving face masks soaked in "Coca-Cola" or "Pepsi" to children. Two witnesses referred to rumours in the town of people trying to "blame" the Government or stage the incidents.

51. A witness described an air strike on the house of an armed opposition group fighter "at the end of April". The next day, people wearing masks were "digging

something out of the ground" and filming the scene, saying that Al-Tamanah had been hit with toxic chlorine gas. The witness did not smell gas or see injured people, however. When interviewed previously, the witness had not mentioned the incident.

52. Some of the witnesses said that armed men, some of them from Al-Tamanah and some foreigners, had been issuing false chemical alarms and saying that the government forces would attack the village with chemicals, sometimes specifying chlorine, and telling people to leave the village. The alerts were issued in various ways, from vehicles and mosques using microphones and loudspeakers or simply in person. Two witnesses mentioned the same person who was allegedly filming the "staged" scenarios.

53. One witness said that people had been knocking on the door. People on motorcycles and in cars had told people to leave their houses because an aeroplane was going to attack. Children of various ages had been running after them. Apparently the people, whom the witness believes to belong to the Nusrah Front, had gone to the school, taken the children out and given them diapers soaked with a liquid in order to use as gas masks, claiming that chlorine would be used in the air strike. The witness stayed at home, despite the warning, and smelled and saw nothing.

Leadership Panel's assessment

54. The Leadership Panel examined the existing information and evidence regarding the incident in Al-Tamanah on 25 and 26 May 2014 and determined that there was insufficient evidence to draw a conclusion on the actors involved and the modality of the use of chemicals as weapons in this incident.

55. This assessment was based on the following:

- There is scarce relevant information about all incidents in Al-Tamanah. No flight movements could be established by the Mechanism.
- Several witnesses stated that, since April 2014, "false" chemical weapons alerts had occurred frequently at non-regular intervals and that no chemicals had ever been used as weapons in Al-Tamanah.
- Other witnesses reported an unexploded "barrel bomb" that leaked chlorine. There was insufficient evidence to corroborate that testimony, however.

Annex VII

Qmenas, 16 March 2015

Findings of the fact-finding mission

1. The fact-finding mission refers to an incident on the night of 16 March 2015 between 2000 and 2100 hours, stating that "the occupants of the houses situated in the eastern and north-eastern part of the village, relatively close to the impact point, smelled an odour similar to chlorine-based household cleaning agents, but much more intense".[1]

2. The mission further states that, "from the 60 or so individuals who arrived from Qmenas to the Sarmin field hospital on 16 March 2015, 40 cases had clinical signs of anxiety, six cases were considered as secondary exposure (one treating physician and five first responders), and 14 patients were considered as directly exposed".[2]

3. Lastly, the mission states:

> In itself, no one source of information or evidence would lend particularly strong weighting as to whether there was an event that had used a toxic chemical as a weapon. However, taken in their entirety, sufficient facts were collected to conclude that incidents in the Syrian Arab Republic likely involved the use of a toxic chemical as a weapon. There is insufficient evidence to come to any firm conclusions as to the identification of the chemical, although there are factors indicating that the chemical probably contained the element chlorine.[3]

Mechanism's investigation

Background

4. Qmenas (Idlib governorate, Idlib district) is located 6 km south-east of Idlib city. Sarmin is less than 5 km to the north-east and Saraqib 12 km to the east, the latter located at the junction of the M5 motorway between Damascus and Aleppo and the M4 motorway to Ladhiqiyah. The airfield of Taftanaz is approximately 13 km (linear distance) to the north-east.

5. In the census conducted in 2004, the village of Qmenas had about 2,700 inhabitants. In August 2014, the Office for the Coordination of Humanitarian Affairs recorded high numbers of internally displaced persons in Idlib district. Some sources report that Qmenas still had a large population, given that many people from Idlib city had been displaced there and often stayed with relatives, while other sources state that the village had been depopulated given its proximity to the front line.

6. In 2014, the government presence in Idlib consisted of networks of checkpoints and military installations: one running along the M5 motorway between

[1] See S/2015/908, enclosure IV, annex 2, paras. 3.8 and 3.9.
[2] See ibid., para. 3.12.
[3] See ibid., para. 5.19.

Ma'arrat al-Nu'man and Khan Shaykhun, and the other along the M4 motorway connecting Ladhiqiyah to Idlib city.

7. In the middle of 2014, the Nusrah Front[4] began to fight armed opposition groups in Idlib, many of whom it had been fighting alongside against the Government. Those included Jabhat al-Thuwar and Harakat Hazm. The Nusrah Front took control of several regions and towns in Idlib governorate, in addition to weapons and facilities of the groups that it defeated.

8. On 15 December 2014, the Nusrah Front, as well as Ahrar al-Sham, the Soldiers of al-Aqsa and fighters from armed opposition groups, captured the military bases of Wadi Deif and Hamidiyah and thus controlled the M5 motorway north of Murak and several military checkpoints, cutting an important government access route to Idlib and consolidating their presence in the southern part of the governorate.

9. Qmenas and Sarmin, immediately to the west of Idlib city, were controlled by armed opposition groups and immediately next to the front line. Towards the east, Saraqib, at the strategic junction between the M5 and M4 motorways, and Taftanaz military airbase had been under the control of armed opposition groups since November 2012 and January 2013, respectively.

10. The Government controlled Idlib city and military bases south of Idlib, 4 km west of Qmenas.

11. On 24 March 2015, several factions officially announced the formation of the Army of Conquest and began operations to seize Idlib city, temporarily succeeding on 28 March 2015 after heavy clashes. The founding members of the Army of Conquest included the Nusrah Front, Ahrar al-Sham, the Soldiers of al-Aqsa and Faylaq al-Sham.

12. Qmenas served as one of the bases to prepare the Idlib offensive, with the presence of the Nusrah Front and other Army of Conquest factions. While some sources stated that Ahrar al-Sham controlled the village, the group did not confirm that. Witnesses reported military installations in the village, without specifying the affiliation of fighters or groups.

13. A witness stated that armed groups had been preparing to attack Idlib "in order to liberate it" and that the incident had occurred a few days before the beginning of the offensive. According to the same witness, fighters were positioned in Qmenas and on the road to Sarmin awaiting the attack.

14. Between 16 March and 20 May 2015, the incident in Qmenas was the first of several incidents reported in and around Idlib city in which chemicals were used as weapons, as recorded by the fact-finding mission. It remained the only incident in Qmenas, however. The incidents in Sarmin that same night occurred only two to three hours later.

15. Qmenas has no health-care facilities; the nearest available facilities are the field hospital in Sarmin and the general hospital in Saraqib.

[4] On 30 May 2013, the Nusrah Front was designated as a terrorist group by the Security Council in accordance with resolution 1267 (1999).

Narratives

16. The description that emerged from the testimony of fact-finding mission witnesses was that a helicopter dropped two items or "barrel bombs" at the edge of a military zone. A few minutes later, the witnesses noticed a chlorine-like odour. Those exposed suffered from tearing of the eyes, coughing and breathing difficulties. A chemical alert was issued through a local warning system, causing panic.

17. The Government denied any air movements in that area on that day and provided an alternative explanation of the exposure of people to chemical substances. The Government reported that the Soldiers of al-Aqsa fighters had transported barrels filled with an unidentified liquid from underground hollows known as Maghawir al-Dawash, located between Sarmin and Qmenas. One of the barrels had fallen from the vehicle, releasing gas that affected the fighters and some residents of Qmenas and Sarmin. All suffered from "asphyxiation".

18. During the investigation, the Government provided information indicating that opposition fighters had used a hell cannon filled with chemicals against other armed opposition groups. Owing to the lack of supporting information and inconsistency with the Mechanism's findings, the use of a hell cannon has been excluded as a viable option.

Date and time

19. Three witnesses confirmed that the event had occurred on 16 March 2015. The indications of the time diverge slightly, but focus on around 2000 and 2100 hours. Four Member States provided information that supports the time of the incidents. The Government confirmed the date of the incident involving chemicals, but did not provide a time.

Weather conditions

20. The sunset in Qmenas on 16 March 2015 was at 1741 hours. From 2000 to 2100 hours, the temperature was 10°C, with wind from the west (260°) at a speed of 3 m/s. The humidity was 95 per cent.

Impact location

21. One witness stated that both "barrel bombs" had impacted inside a military zone; another said that only one had impacted inside the military zone and the other in a residential area.

22. The Dawash hollows are located on the south-west outskirts of Sarmin, near the road to Qmenas. The distance between the hollows and Qmenas is approximately 3 km.

Location No. 1

23. Three witnesses showed the impact location on a map, on the outskirts of Qmenas on the road to Nayrab. The differences in the coordinates were minimal.

24. To corroborate the location, 10 images of the alleged impact location were examined by a forensic institute. It concluded that all 10 included image content that visually linked the images together and thus could confirm that all the images

depicted the same place. The metadata examination and visual analysis showed no sign of manipulation.

25. There are no indications that the pictures were altered to include the remnants. Given that the pictures were taken two days after the attack, however, it cannot be ruled out that the remnants could have been placed at the location beforehand.

26. Through a visual comparison of the pictures with satellite images, the forensics specialist determined geographical coordinates for this location matching those shown by the witnesses (see table).

Coordinates of location No. 1 as provided by different sources

Source	*Latitude (decimal)*	*Longitude (decimal)*
Witness	N35.882889°	E36.680778°
Witness	N35.882833°	E36.681222°
Witness	N35.882833°	E36.680722°
Forensic institute	N35.882772°	E36.681096°

Location No. 2

27. Only one witness gave information on the second impact location as being at coordinates N35.882972° and E36.679111°. This is close to location No. 1, further inside the village. The Mechanism found no additional information to confirm the coordinates for location No. 2, or any other information on the barrel bomb that allegedly fell there. Two witnesses stated that a military facility or militarized zone had been impacted, and that civilians had been affected because the wind had carried the gas to a residential area. The kind of military installation or presence, as well as the military actor, could not be established, apart from the fact that it was not a Syrian Arab Armed Forces facility, but related to an armed opposition or other group.

Munition

28. The following considerations are derived from the analysis of location No. 1, given that no further information is available on location No. 2.

29. Witnesses described the remnants of the device as a metallic barrel or drum, with a number of exploded gas canisters. This description tallies with pictures analysed by the Mechanism and forensic institutes. The metallic barrel, which is possibly the outer jacket of the bomb, has fins. A small exploded canister of a blue-greenish colour is also visible in the pictures. Regarding authenticity, the forensic analysis of the photographs concluded that the results of the examination supported the assertion that the images had not been manipulated and had been taken two days after the event.

30. Witnesses described a marking on the barrel ("IYAD"), but this cannot be seen in the pictures.

31. According to explosive experts, had the barrel contained high explosives, the outer jacket would most probably have splintered into small pieces and been completely destroyed. It is also possible that the explosive filler did not explode, but that would not explain the canisters found.

32. The remnants seen in this and other pictures look similar to the remnants seen in Sarmin (canisters and outer jacket), from the incident that occurred on the same day.

Delivery method

33. Witnesses stated that they had heard helicopters and the sound of an explosion, which they described as "muted" in comparison with other air-strike impacts, and had received shortly thereafter a chemical weapon alert through hand-held radios and the loudspeakers of the minarets of the mosques.

34. A witness described an intercepted radio communication of two helicopter pilots, allegedly using the call sign "Bravo". According to this testimony, a helicopter took off from Ladhiqiyah airport at around 2100 hours. A few moments after the pilot had indicated having "entered the working area", residents reported the impact of a barrel bomb. This occurred at around 2130 hours. It would take a helicopter between 30 and 33 minutes to travel from Ladhiqiyah airbase to Qmenas.

35. After reviewing the type of helicopters in the Syrian Arab Armed Forces fleet and the distance from Ladhiqiyah airbase to Qmenas, the witness' assessment of the time needed to reach Qmenas from Ladhiqiyah is considered correct.

36. The Mechanism gathered information that a helicopter departed from Bassel al Assad Airport in Ladhiqiyah at 2030 hours and passed over Qmenas at 2105 hours, returning to the base at 2130 hours.

37. The Government stated that there had been no flight activity on that day in that area, but did not provide supporting documentation such as flight records. The Government did not respond to questions regarding the call signs used.

Location No. 1

38. A defence institute studied the images of the remnants and made the following statement with regard to the outer barrel: "[It] has the hallmarks of being dropped from an aircraft. The stabilizing fins are clearly visible as well as a mount for attaching the device to the aircraft. This [barrel bomb] has probably been carried underneath the wings or hull of an aircraft (fixed-wing or helicopter). It is doubtful it was carried by a rocket."

39. A ballistic expert and a defence institute studied the crater at location No. 1 to determine the delivery method. The crater in the pictures can be observed on satellite imagery dated after 16 March 2015 at the location determined.

40. The ballistic expert concluded that "a bomb, dropped from a helicopter at high altitude, and hitting the ground somewhat obliquely, would be quite likely to create an impact mark looking similar to the one shown in" the crater at location No. 1. The expert noted that the crater had changed between the moment of impact and when the picture was taken, as follows: "On the image it appears that a heavy lorry may have driven across the mark after it was made. It could also be possible that some material was filled back into the hole before the photo was taken, if it had been somewhat deeper, to permit traffic to pass unobstructed."

41. The defence research institute concluded that the image of the crater was consistent with an object dropped from high altitude on to a hard surface. It could not rule out the possibility that "it was simply a bad road" or that someone had dug

a hole. It also noted that there were no obvious signs of a large detonation, meaning that the device either contained a small quantity of explosives or the explosive filler did not function properly.

42. The Mechanism, with support from several external experts, assessed the possibility that the munition found had been launched from a land-based launcher. This was considered not feasible, however.

Location No. 2

43. No information was available on the second location mentioned by witnesses, which was potentially located in a militarized zone.

Damage and effects

Location No. 1

44. Witnesses stated that the soil around location No. 1 had partly changed its colour to reddish-pink. Such colouring is not visible in the photographs.

45. The pictures of the impact location show a visible discolouration of the vegetation. A satellite image vegetation index analysis showed "less healthy" vegetation in the north and east of the crater. While damage and effects would suggest the use of chlorine or other toxic chemicals, the Mechanism could not rule out other possible causes.

Location No. 2

46. No information was made available.

Medical effects

47. According to witnesses, ambulances were dispatched to Qmenas after the alerts, but arrived when all those affected had left. One witness stated that some people had stopped the ambulances and told them to return, given that all patients had already left.

48. Three witnesses confirmed the number of patients given in the fact-finding mission report (S/2015/908). According to these statements, 60 people sought medical assistance at Sarmin hospital from 2045 hours onward; however, the medical staff assessed that only 20 of them presented clinical symptoms relating to chemical exposure, while the others presented symptoms relating to anxiety and panic. A witness stated that some opposition fighters had been exposed and treated by their military units within their area. There were no deaths reported.

49. Witnesses confirmed the number of patients and provided some names, but no medical records were provided, several requests notwithstanding.

50. The information available on the amount of chlorine gas and dispersion rate, obstacles and topography was not sufficient for a scientific analysis of the potential chlorine dispersion. With this in mind, the Mechanism used part of the dispersion model provided by a defence research institute, the established impact location and the weather information at the time of the incident to assess whether the number of affected people was in the realm of possibility. Noting the lack of information on the exact conditions, the Mechanism found that this appeared to be the case.

51. The Government stated that people in Sarmin and Qmenas had been affected as a result of the car accident with a barrel containing chlorine. The numbers of people affected, according to the Government, are lower than the numbers provided by the hospital in Sarmin and other witnesses.

52. To affect the population of Qmenas, this accident would have had to have occurred on the outskirts of the village. Anywhere further in the direction of Sarmin and the exposure of civilians in Qmenas would have been significantly reduced. Were the car accident close to Qmenas, however, the population in Sarmin would not have been exposed to chlorine gas or another toxic gaseous substance, given that the direction of the wind was not towards the east and the dispersion would have passed by Sarmin in the south.

Leadership Panel's assessment

53. The Leadership Panel examined the existing information regarding the incident in Qmenas on 16 March 2015 and determined that a Syrian Arab Armed Forces helicopter had dropped one device or barrel bomb in Qmenas.

54. Although the Leadership Panel was close to having sufficient information to reach a conclusion on the actors involved, at the current stage it could not draw a conclusion with certainty as to whether the device or barrel bomb contained explosives or chlorine.

55. The Leadership Panel determined that the case merited further investigation.

56. This assessment was based on the following:

- According to witness statements, a helicopter dropped two devices at the edge of a military zone in Qmenas. However, only one impact location, as provided by three different witnesses, could be corroborated through forensic analysis of pictures and satellite images.
- The remnants of a device found near the impact crater resemble the remnants of barrel bombs found near other impact sites, most notably in Sarmin. Nevertheless, from the analysis of the remnants and the crater it was not possible to determine whether the device contained explosives or toxic chemicals.
- The Mechanism was offered alternative descriptions of the event, such as the accidental release of gas from a barrel that fell from a vehicle operated by an armed opposition group, or opposition fighters using a "hell cannon" filled with chemicals against other armed opposition groups. The Mechanism was unable to obtain any credible information that would support those alternatives.
- The Mechanism obtained information that a helicopter passed over Qmenas on the date and at the time of the incident.
- The Government indicated that there had been no Syrian Arab Armed Forces flights on 16 March 2015 in the area, but did not provide any supporting information. However, the Mechanism obtained information from other sources that corroborates the helicopter flights on the date and at the time of the incident.

- When the incident occurred, the Government had lost control of six airbases, including Taftanaz airbase (Idlib governorate). The Government informed the Mechanism that 15 helicopters had been left behind at Taftanaz airbase, 9 of which had been deemed operational.
- The Leadership Panel reviewed all the information gathered and found no evidence that armed opposition groups in Qmenas had been operating a helicopter at the time and location of the incident.

Annex VIII

Sarmin, 16 March 2015

Findings of the fact-finding mission

1. The fact-finding mission described two incidents that occurred on 16 March 2015 between 2230 and 2300 hours in Sarmin.[1]

2. The mission states that "between 3 May and 5 June 2015 the fact-finding mission team interviewed 21 individuals who provided accounts and information regarding incidents of alleged use of toxic chemicals as a weapon in and close to this village on 16 March, 23 March, and 26 March 2015, and 16 May 2015".[2]

3. Lastly, the mission states:

> In itself, no one source of information or evidence would lend particularly strong weighting as to whether there was an event that had used a toxic chemical as a weapon. However, taken in their entirety, sufficient facts were collected to conclude that incidents in the Syrian Arab Republic likely involved the use of a toxic chemical as a weapon. There is insufficient evidence to come to any firm conclusions as to the identification of the chemical, although there are factors indicating that the chemical probably contained the element chlorine.[3]

Mechanism's investigation

Background

4. Sarmin (Idlib governorate, Idlib district) is approximately 7 to 8 km south-east of the eastern outskirts of Idlib city, on the road to Saraqib. Binnish is approximately 5 to 6 km north of Sarmin, while the airfield of Taftanaz is 8 km north-east. Qmenas is 5 km to the south-west of Sarmin. Bassel al-Assad Airport in Ladhiqiyah is located approximately 85 km away on the Mediterranean coast.

5. In the census conducted in 2004, Sarmin had approximately 14,500 inhabitants. According to the fact-finding mission, owing to the proximity of the front lines, Sarmin had been depopulated in 2015 to less than 5,000 people. In August 2014, the Office for the Coordination of Humanitarian Affairs identified only 2,500 people in need in Sarmin and no internally displaced persons, but a high number of internally displaced persons were recorded in Idlib district. Other statements, however, have indicated that Sarmin still had a large population, and many of the internally displaced persons had relocated there from Idlib.

6. In 2014, the government presence in Idlib consisted of networks of checkpoints and military installations: one running along the M5 motorway between Ma'arrat al-Nu'man and Khan Shaykhun, and the other along the M4 motorway connecting Ladhiqiyah to Idlib city.

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[1] See S/2015/908, enclosure IV, annex 2, para. 3.29.
[2] See ibid., para. 3.35.
[3] See ibid., para. 5.19.

7. In the middle of 2014, the Nusrah Front[4] began to clash with many of the armed opposition groups with which it had previously been fighting alongside against the Government. Those included Jabhat al-Thuwar and Harakat Hazm. Consequently, the Nusrah Front took control of several regions and towns in Idlib governorate, in addition to some of the weapons and facilities of those armed opposition groups.

8. On 15 December 2014, the Nusrah Front, as well as Ahrar al-Sham, the Soldiers of al-Aqsa and fighters from armed opposition groups, captured the military bases of Wadi Deif and Hamidiyah, south of Ma'arrat al-Nu'man, and thus gained control of the strategic M5 motorway north of Murak and several military checkpoints. This cut an important access route to Idlib, impeding the ability of the Government to resupply its forces within the city and surrounding area.

9. By March 2015, Qmenas and Sarmin, immediately to the east of Idlib city, were controlled by armed opposition groups, as was Binnish to the north. Sarmin had been largely controlled by Liwa' Dawud until 2014, when the group's commander defected to join Islamic State in Iraq and the Levant. Some 100 fighters reportedly declined to join the commander and returned to Sarmin to join other groups. Ahrar al-Sham did confirm its presence in March 2015. Faylaq al-Sham and other factions of the Army of Conquest were likely to have been present.

10. Further to the east, both Saraqib and Taftanaz military airbase were also under the control of armed opposition groups from November 2012 and January 2013, respectively.

11. The Government still controlled Idlib city and the military bases near Mastumah, south of Idlib. Pro-Government paramilitary national defence forces also controlled the nearby communities of Fu'ah and Kafraya, north of Binnish.

12. On 16 March 2015, there were two allegations of the use of chemicals as weapons in Sarmin and one in Qmenas. A witness stated that, on 16 March 2015, the armed groups located in Qmenas and on the road from Qmenas to Sarmin had been preparing for the attack on Idlib city (which began on 24 March 2015).

13. On 24 March 2015, several groups officially announced the formation of the Army of Conquest (elements included the Nusrah Front, Ahrar al-Sham, the Soldiers of al-Aqsa and Faylaq al-Sham), which began operations to seize Idlib city. The city fell to its control on 28 March 2015.

14. By the end of May 2015, the fact-finding mission had recorded allegations of five incidents of alleged use of chemicals as weapons in Sarmin.

15. Sarmin has one primary health-care centre, one private clinic and one field hospital, which was previously supported by the Syrian Arab Red Crescent and now also by the Syrian American Medical Society.

Narratives

16. The description that emerged from the fact-finding mission is that, on 16 March 2015 at around 2230 to 2300 hours, a helicopter dropped two barrel bombs filled with chlorine or chlorine derivative, resulting in the release of chlorine

[4] On 30 May 2013, the Nusrah Front was designated as a terrorist group by the Security Council in accordance with resolution 1267 (1999).

gas. One fell on an open field (location No. 1). The other fell through the ventilation shaft of a partially built house (location No. 2). There was a family of six living in the basement of the house, all of whom died in the incident. The population was warned through a local early warning system. Those close to the impact described the odour of chlorine. In total, 26 people were treated in hospital in Saraqib and Sarmin after experiencing a feeling of suffocation.

17. The Government denied any air movements in that area on that day and provided an alternative explanation of the exposure of people to chemical substances. The Government reported that the Soldiers of al-Aqsa fighters had transported barrels filled with an unidentified liquid from underground hollows known as Maghawir al-Dawash, located between Sarmin and Qmenas. During a car accident, one of the barrels had fallen from the vehicle, releasing gas that affected the fighters and some residents of Qmenas and Sarmin. All suffered from "asphyxiation".

18. Another description of the events, given by another source, indicated that an air strike by the Syrian Arab Armed Forces in the vicinity of Sarmin at around 2200 hours had destroyed depots containing conventional ammunition and non-poisonous chemicals. A fire had led to the release of "caustic combustion gases" from the chemical agents, which had then been used as a pretext to make allegations against the Government. The Mechanism could not obtain information to confirm an air strike or the explosion of a munition depot. The Government stated that overflights had been very common in that period, but denied that there had been air operations on 16 March 2015, although it did not provide documentation to support this.

Date and time

19. Three witnesses confirmed that the two incidents had occurred on 16 March 2015 at approximately 2230 hours. No exact time was given for the alleged car accident or air strike on a munition depot.

Weather conditions

20. The sunset in Sarmin on 16 March 2015 was at 1741 hours. From 2200 to 2300 hours, the temperature ranged from 9°C to 10°C. The wind came from the west (260°), with a speed of 3 m/s. The relative humidity was at 96 per cent.

Impact location

Location No. 1

21. A witness identified the first impact location as an agricultural field, adjacent to a target of potential military interest, at N35.902407° and E36.729282°.

22. Photographs and videos of the incident were forensically analysed for metadata extraction, image analysis and manipulation. A forensic institute, through image analysis and a visual comparison with satellite images, confirmed the impact location.

Location No. 2

23. Three witnesses identified the house on a map where a device fell and six people died. Through analysis of photographs, satellite images and videos, the

following coordinates were identified as the second impact location: N35.903257° and 36.729642E°.

24. The forensic institute, through image analysis and a visual comparison with satellite images, confirmed the impact location (see table).

25. Locations Nos. 1 and 2 are 90 m apart. While no Global Positioning System (GPS) coordinates or time stamp could be obtained from the material analysed, the forensic analysis established that all the photographs and videos submitted included image content linked to at least one other image for the two locations. Nine pictures and seven videos were analysed by a forensic institute.

Coordinates of location No. 2 as provided by different sources

Source	*Latitude (decimal)*	*Longitude (decimal)*
Witness	N35.903257°	E36.729642°
Witness	N35.903214°	E36.729650°
Witness	N35.903197°	E36.729594°
Forensic analysis	N35.903257°	E36.729642°

Location No. 3

26. The Dawash hollows are located on the south-west outskirts of the village of Sarmin, close to a road that links Sarmin to Qmenas (N35.897722° E36.714589°). The exact location of the alleged car accident could not be determined.

Munition

Location No. 1

27. Three witnesses described "a barrel" (parts of the outer jacket) and several "canisters". One stated that the canisters looked similar to those filled with refrigerant gas for refrigerators. That witness also described the odour of chlorine.

28. One witness described the outer jacket as a 125-cm long "makeshift" weapon, which was "obvious[ly] locally made". It had three or four iron rollers, which were fixed rollers that could function as wheels. The barrel bomb was made of a thick metal.

29. The Mechanism analysed several pictures of the remnants of the munition and submitted several of them for forensic analysis. While no signs of manipulation of the pictures could be found, it appeared that the remnants had been moved from the point of impact (crater) to the road.

30. The pictures show several exploded canisters and pieces that were most probably parts of the outer jacket ("barrel"). On the outer jacket, "stabilizing fins" and the "wheels" can be seen.

31. According to explosive experts, the large size of the remnant of the outer jacket indicates a smaller explosive charge. Had the barrel been filled with large quantities of explosives, it would likely have disintegrated into very small fragments. Theoretically, if a larger explosive charge did not function properly, the size of the remnants could be larger. No remaining explosives can be seen in the pictures, however.

Location No. 2

32. A witness said that the size of the munition ("barrel") was 150 cm in height and 60 cm or more in diameter. The witness stated that there were several gas canisters of the kind filled with refrigerant gas used in air conditioners. The canisters bore English inscriptions. The inside of the canisters was yellow. A video shows the remnants, damage and debris in each room of the house, as described by the witness. The witness had seen this several hours after the attack.

33. Several videos and pictures provided by witnesses and retrieved from open sources show the impact location and remnants. This includes videos taken by first responders who tried to enter the house during the night through thick smoke to rescue the family members in the basement, as well as videos showing the impact scene the next day. The device is understood to have fallen into a kitchen area. The outer jacket is visible in the pictures, in addition to a cylinder from a heating system that is not part of the munition. There is a lot of rubble and parts of a collapsed structure, while the dishes and items on the kitchen shelf are in place. In other videos, the shelves have been emptied, indicating that this video was taken at an even later stage.

34. Some pictures and videos show exploded refrigerant canisters, as described by the witnesses, in addition to a reddish or purple substance on the floor. This is understood to be possibly from potassium permanganate. According to a forensic institute, potassium permanganate would be delivered as a powder. The purple liquid phase would be caused by a secondary effect, such as contact with water.

35. The fact-finding mission was provided with samples, which were analysed in a laboratory designated by the Organization for the Prohibition of Chemical Weapons to determine whether any chemical substance had been used. Neither the mission nor the Mechanism was able to establish the full chain of custody for these samples.

36. The canisters are hydrochlorofluorocarbon gas canisters used in household items, such as refrigerators and air conditioners. On the basis of the script on a canister, it appears that the canisters were manufactured according to United States standards as non-reusable canisters for disposal after use. The canisters were produced by various manufacturers. The canisters could have been easily retrieved. However, to refill and repurpose them to be part of the device, some modifications would have been necessary. A Member State provided analysis that refilling the canisters would bear a high risk and require modification of the valves. For this process, some technical expertise and equipment, including the ability to create conducive conditions, would be required.

37. The indentation line, fractures and cuts in the metallic canister appear to be consistent with the use of a detonation cord. A blasting cap, fitted with the fuse, appears to have been taped to the base of the barrel, and the detonation cords fitted to the blasting cap and taped around the cylinders.

38. The plastic bottles are believed to be 500 ml polyethylene terephthalate bottles filled with potassium permanganate. Mixing with the content of the refrigerant containers upon explosion, the potassium permanganate would have generated the chlorine. As discussed above, the potassium permanganate could have caused the purple colour of the soil. Potassium permanganate is used in pharmaceutical products, water treatment, disinfection products and for other civilian purposes;

however, chlorine may be produced by the reaction of hydrochloric acid with potassium permanganate.

39. The laboratory analysis did not provide sufficient evidence to confirm the exact composition of the toxic substance used, but strongly supported the use of chlorine or a chlorine derivative. Higher concentrations of chloride were found on the inner surface of the refrigerant cylinders than on the exterior surface. This indicates that a chlorine-containing substance was in the cylinders, in the form of either chlorine or hydrochloric acid.

40. Bornyl chloride was also found on a piece of wood removed from the affected building. This substance is the product of the reaction of hydrochloric acid or chlorine with alpha-pinene, a terpene-based wood ingredient.

41. It has been suggested that this could indicate a two-component reaction needed to produce the toxic substances, and other less toxic chemicals are contained in the device and brought to reaction upon impact. This theory has been supported by analysis provided by another source.

42. The presence of trinitrotoluene was identified in some of the samples. This explosive is not normally found in detonation cords or in the cylinders and the hypothesis of the working model described above would not explain its presence. Traces may be present owing to contamination of the munition parts during construction. However, additional analysis to verify the presence of explosives is needed to allow a definitive conclusion to be drawn.

Location No. 3

43. No further information could be found on a barrel of chemicals that fell from a truck, as indicated by the Government.

Delivery method

44. Eight witnesses heard at least one helicopter flying over Sarmin between 2230 and 2300 hours. Several of them stated that the helicopter or helicopters had dropped two items. The statements about the time elapsed between the impacts are slightly diverging. The sound of the falling items was described as a sound made by a diving fighter jet, followed by a soft explosion.

45. One witness heard through a radio communication system used to intercept Syrian Arab Armed Forces communications that a helicopter had taken off from Ladhiqiyah airbase. The witness stated that a helicopter was returning to Ladhiqiyah airbase after having dropped a barrel bomb on Qmenas at approximately 2130 hours. The helicopter flew over Sarmin between 2230 and 2330 hours and dropped two items. The pilot communicated with the base twice about having "executed", with a difference of one minute. Then, the pilot informed the base, saying "Sir, the barrels are at the terrorist area".

46. One source shared its assessment that a helicopter departed from Ladhiqiyah (Bassel al-Assad Airport) at 2215 hours and flew over Sarmin at around 2250 hours, returning to base at 2325 hours. The Government stated that there had been no Syrian Arab Armed Forces flights from Ladhiqiyah or other airbases in the region on 16 March 2015, but, repeated requests notwithstanding, provided no supporting information, such as flight plans.

Location No. 1

47. The Mechanism analysed the impact, remnants and crater with a view to ascertaining the delivery method. Experts agree that the launch of a barrel of the size and kind described above from a land-based cannon or mortar-like launching system is not feasible, and highly unlikely from a rocket-based launcher.

48. Asked whether the crater could result from the impact of a bomb dropped from a helicopter from high altitude, the expert stated that that was "quite likely". The expert had used the following calculation: a steel barrel bomb of 60 cm in diameter and 150 cm in length, containing nine pressure tanks/canisters, filled with either hydrochloric acid or chlorine, and weighing approximately 390 kg.

49. A defence institute analysed the pictures of the remnants and conveyed its view that it had the "hallmarks of being dropped from an aircraft" and that "stabilizing fins are clearly visible ... and also a mount for attaching the device to the aircraft".

Location No. 2

50. A ballistic expert analysis supports the statement of the witnesses, improbable as it sounds, that the device impacted through the ventilation shaft. There is a pale whitish mark on the right side of the shaft, which is likely to be the impact mark.

51. According to another forensic analysis, the deformation of the canisters and the plastic bottles is consistent with a mechanical impact, such as upon impact on the ground, and an explosive rupture, most probably through the detonation cord, set off by the blasting cap. The sound produced upon impact would not be expected to be as loud as a device filled with explosives.

52. Another laboratory states that, from the samples, it was "difficult to fathom" that the device was launched from the ground. The weight and location of the remnants would suggest that they had fallen from a helicopter, given that this device would have been too heavy to launch from the ground. In addition, the canisters would have fallen further apart.

Location No. 3

53. The barrel "with an unidentified liquid" fell from a truck. No further information has been provided on the nature and content of the barrel or on the truck.

Damage and effects

Location No. 1

54. According to a witness, the crater was 150 cm wide and 50 cm (or 75 cm) deep, which tallies with the crater seen in the pictures and several open-source videos. A ballistic expert studied the crater and estimated the size as being approximately 250 cm in diameter and less than 70 cm in depth, although cautioning that matter could have fallen back into it after the actual impact, reducing the depth.

55. Differences in the colour of the grass can be observed around the crater. A satellite image vegetation index analysis shows "less healthy" vegetation at the open

field where the crater is located (location No. 1), next to location No. 2. This could have been caused by chlorine or other toxic chemicals, but there are other causes.

Location No. 2

56. The entry point of the device into the partially built residential house (location No. 2) was a ventilation shaft. The device fell down to the basement and impacted the kitchen. In the basement were, apart from the kitchen, three bedrooms and a hall. There is no crater, but the basement was partially destroyed.

57. A ballistic expert stated that the bomb appeared to have impacted the kitchen wall. In the expert's view, that objects and shelves appear relatively intact would exclude a major explosion. The structure or vault on its top might rather have collapsed when the kitchen wall was impacted, but it may also have been directly impacted. The damage could have been caused by the device impacting one end of the ventilation shaft, bouncing against the rock wall, impacting walls and other structures below the upper floor, which, when collapsing, pulled with it other parts of the ceiling and possibly a staircase. A defence institute shared this assessment and concluded that it was possible that the damage had been caused by the kinetic effect of the impact (i.e., the barrel bomb broke the structure of the building after falling from high altitude).

58. The Government stated that the cause of the explosion had been an accident with a liquefied petroleum gas (often referred to as propane) cylinder (cooking gas). There is, however, no evidence of fire inside the kitchen, which reduces the probability of such an accident.

59. In addition, as an expert analysis points out, there was no apparent blackening of the walls, which would be expected in the event of an explosion or detonation of any high explosive. There were signs of only a very minor explosion, such as that of a detonating cord, having occurred, if any at all. A defence research institute noted that, had there been a large detonation, there would have been more signs of scourging, more damage to the items in the background and fewer remnants of the barrel bomb itself.

Medical effects

60. According to witnesses, 17 patients were treated at the Sarmin field hospital and 11 at the Saraqib field hospital. In addition, witnesses stated that 20 civil defence personnel had also received first aid treatment because they had suffered secondary exposure. All six members of the family living at location No. 2 died.

61. A witness stated that a man, his wife and their youngest child had managed to get out of the house and called for help. The eyewitnesses described an irritating smell, similar to chlorine used as a household cleaning agent but much more intense. The odour immediately induced coughing and a feeling of suffocation among all those exposed. The three family members were brought to the Sarmin field hospital. The woman told first responders that the grandmother and two children were still in the house. Several first responders tried to rescue them but had to return because they were affected and suffered from symptoms ("suffocation") when they entered the house.

62. None of the witnesses provided information on how the other family members were finally evacuated. In the video material they appear in the hospital, however. The grandmother is apparently dead and the two other children are unresponsive.

63. A witness provided reports signed by doctors at the Sarmin hospital, confirming the death of the six family members, but not certifying the cause of death.

64. In an attempt to estimate the number of people who would likely be exposed to the release of chlorine, a basic simulation exercise of the possible chlorine dispersion was carried out. The exercise presents the probability and severity of injuries, considering the theoretical concentration of the chemical in the atmosphere.

65. To obtain a more reliable number of casualties, certain aspects, such as position and distance from the terrain, rate of dispersion of the substance at source, urban characteristics and obstacles, topography and actual population density and characteristics (gender, age, pre-existing conditions, etc.), would need to be known. Nevertheless, with this in mind, the Mechanism used part of the model to assess the effect on the population exposed.

66. The death of six persons in this case may be explained as exposure that occurred in an underground, confined space. Given that chlorine is heavier than air, it would be directed to and remain in the lowest areas where it was released (i.e., the basement).

67. The model had predicted a higher number of affected people (91), based on a calculation in the city centre. Applying the predicted chlorine plume to the actual weather conditions and the impact location in the outskirts of the village, a lower number of affected people would be expected. Given that the exact population density in the area at the time of the incident could not be established with certainty, no exact calculation can be made.

68. In relation to the incident in which a barrel fell from a truck, it is noted that the accident would have had to have happened quite close to Sarmin, in the vicinity of the Dawash hollows, to cause exposure of any patients in Sarmin. Considering the wind direction, in an accident close to Sarmin on the road to Qmenas, a toxic gas could have been carried to Sarmin and affected people on the outskirts of Sarmin, especially on its south-western border. This could not, however, explain the people exposed in eastern Sarmin.

69. This accident allegedly affected the population of Qmenas and Sarmin. To affect the population of Qmenas, it would have had to have occurred near the outskirts of Qmenas, at most 500 m from the centre of Qmenas. In that case, however, it would have been impossible for the population of Sarmin to have been exposed to chlorine gas or another toxic gaseous substance, given that the direction of the wind was not towards Sarmin but towards the south of the village.

Leadership Panel's assessments

70. The Leadership Panel examined the existing information regarding the two impact locations in Sarmin on 16 March 2015. There is sufficient information for the Panel to conclude that the incident at impact location No. 2 was caused by a

Syrian Arab Armed Forces helicopter dropping a device that hit the house and was followed by the release of a toxic substance, matching the characteristics of chlorine, that was fatal to all six occupants. The remnants of the device are consistent with the construction of a barrel bomb.

71. This conclusion was based on the following:

- Witnesses confirmed that at least one helicopter flew over Sarmin at the time of the incident.
- Expert and forensic analyses support witness statements that a device or "barrel bomb" dropped from a helicopter impacted through the ventilation shaft of a house (impact location No. 2) inhabited at the time by a family of six. The damage was consistent with the kinetic effect of a device or barrel bomb falling from high altitude rather than the explosion or detonation of any high explosive.
- Multiple videos of location No. 2 show HCFC gas canisters inside the house, with a purple substance on the floor.
- The Government indicated that there had been no Syrian Arab Armed Forces flights on 16 March 2015, but did not provide any supporting information. However, the Mechanism obtained information from other sources that corroborates witness statements of Syrian Arab Armed Forces helicopter flights on the date and at the time of the incident.
- When the incident occurred, the Government had lost control of six airbases, including Taftanaz airbase (Idlib governorate). The Government informed the Mechanism that 15 helicopters had been left behind at Taftanaz airbase, 9 of which had been deemed operational.
- The Leadership Panel reviewed all the information gathered and found no evidence that armed opposition groups in Sarmin had been operating a helicopter at the time and location of the incident.

Annex IX

Binnish, 24 March 2015

Findings of the fact-finding mission

1. The fact-finding mission states that it "interviewed only one person from Binnish, who was a treating physician at the time of the alleged incident".[1] The mission indicates that, on 23 March 2015 at around 1900 hours, the physician was in the field hospital and was informed of the incident through local early warning methods, including hand-held radios.[2]

2. Binnish field hospital registered 21 patients relating to the incident on 23 March 2015.[3]

3. Lastly, the mission states:

> In itself, no one source of information or evidence would lend particularly strong weighting as to whether there was an event that had used a toxic chemical as a weapon. However, taken in their entirety, sufficient facts were collected to conclude that incidents in the Syrian Arab Republic likely involved the use of a toxic chemical as a weapon. There is insufficient evidence to come to any firm conclusions as to the identification of the chemical, although there are factors indicating that the chemical probably contained the element chlorine.[4]

Mechanism's investigation

Background

4. Binnish (Idlib governorate, Idlib district) is located 8 km north-east of Idlib. Sarmin is 6 km to the south and Saraqib 12 km to the south-east. The airfield of Taftanaz, under the control of armed opposition groups, is 6 km to the north-east.

5. In the census conducted in 2004, Binnish had 21,848 inhabitants. A witness stated that, at the time of the incident in March 2015, Binnish had a population of approximately 5,000, given that large numbers of people had been displaced. In August 2014, the Office for the Coordination of Humanitarian Affairs indicated that there were 8,500 internally displaced persons in Idlib district.

6. In 2014, the government presence in Idlib consisted of networks of checkpoints and military installations, one running along the M5 motorway between the towns of Ma'arrat al-Nu'man and Khan Shaykhun, and the other along the M4 motorway connecting Ladhiqiyah to the city of Idlib.

7. In the middle of 2014, the Nusrah Front[5] began to clash with many of the armed opposition groups with which it had previously been fighting alongside

[1] See S/2015/908, enclosure IV, annex 2, para. 3.76.
[2] See ibid., para. 3.78.
[3] See ibid., para. 3.79.
[4] See ibid., para. 5.19.
[5] On 30 May 2013, the Nusrah Front was designated as a terrorist group by the Security Council in accordance with resolution 1267 (1999).

against the Government. Those included Jabhat al-Thuwar and Harakat Hazm. Consequently, the Nusrah Front took control of several regions and towns in Idlib governorate, in addition to some of the weapons and facilities of those armed opposition groups.

8. On 15 December 2014, the Nusrah Front and armed opposition groups, including Ahrar al-Sham and the Soldiers of al-Aqsa, captured the military bases of Wadi Deif and Hamidiyah, south of Ma'arrat al-Nu'man, and thus gained control of the strategic M5 motorway north of Murak and several military checkpoints. This cut an important access route to Idlib, impeding the ability of the Government to resupply its forces within the city and surrounding area.

9. On 23 March 2015, the Government controlled Idlib city and the military bases near Mastumah, south of Idlib. Pro-Government paramilitary national defence forces also controlled the nearby communities of Fu'ah and Kafraya, north of Binnish.

10. Binnish was largely controlled by the Nusrah Front and Ahrar al-Sham. Faylaq al-Sham and other groups were also reportedly present. According to the Government, on 23 March 2015, fighters belonging to the Nusrah Front and armed opposition groups had gathered in the western part of Binnish in preparation for the attack on Idlib city and were targeting checkpoints of the Syrian Arab Armed Forces towards Idlib with mortar fire, to which government forces responded with artillery.

11. On 24 March 2015, several groups officially announced the formation of the Army of Conquest (elements included the Nusrah Front, Ahrar al-Sham, the Soldiers of al-Aqsa and Faylaq al-Sham), which began operations to seize Idlib city. The city fell to its control on 28 March 2015.

Narratives

12. The description of events emerging from the fact-finding mission report indicates that, on 23 March 2015,[6] a helicopter dropped a barrel bomb filled with chlorine or chlorine derivative between 1900 and 2000 hours. Chlorine or chlorine derivative was released, affecting 21 people. The Mechanism further investigated the events and established the date of the incident as 24 March 2015. In addition, two possible impact locations were identified and considered.

13. The Government stated that no incident had taken place on either date and that armed opposition groups or their supporters had staged the use of chlorine as a weapon with the intention of blaming the Government.

14. One witness provided hearsay information during an interview about the explosion of a warehouse storing chemicals. The witness stated that, on 22 or 23 March 2015, there had been an explosion at around 1930 hours. The witness recounted the testimony of family members. According to them, yellow and white smoke had gone up into the sky. One family member had experienced breathing difficulties as a result of inhaling something with a distinct smell. The smell had also been noticed by another family member. Other people from Binnish had told the witness that there had been an explosion in Binnish at a warehouse containing gas cylinders, used to produce "hell cannons". The neighbourhood in which the

[6] The fact-finding mission referred to the date of the incident as being 23 March 2015, but the Mechanism has established that the event occurred on 24 March 2015 at around 1900 hours.

warehouse was reportedly located and the time of the accident do not match the date established by the Mechanism.

Date and time

15. While the fact-finding mission referred to the date of the incident as being 23 March 2015, the Mechanism has established that the event occurred on 24 March 2015 at around 1900 hours.

16. Four witnesses indicated that the incident had taken place at around 1900 hours on 24 March 2015. According to one, the Binnish hospital began to receive patients at around 1915 hours. A second witness stated that a telephone call had been received from people in Binnish about the attack at 1900 hours.

17. Several photographs and video files were submitted for independent forensic analysis. For some of the files, the original metadata, including time stamps, had been wiped out and could not be determined.

18. Several individuals posted information concerning the incident on social media, beginning at around 1930 hours on 24 March 2015. Another source provided its assessment to the Mechanism that confirmed the same date and time.

19. Two witnesses indicated an alternative time for the incident on 24 March 2015. One of the two thought that the event might have occurred between 2200 and 2300 hours. The other had heard military radio communications on a walkie-talkie before the attack and during the treatment of patients at Binnish hospital.

Weather conditions

20. The sunset on 24 March 2015 was at 1748 hours. From 1900 to 2000 hours, the temperature was 11°C. The wind came from the north-west (320°) and the wind speed fell from 3 to 2 m/s. The humidity was at 95 per cent. It was partly cloudy.

Impact location

Location No. 1

21. A witness identified the impact point on 24 March 2015 in an agricultural field on the south-eastern side of Binnish, at the coordinates N35.955286° E36.717797°. Another witness described the same impact location of a barrel bomb in the south-eastern area of Binnish in an agricultural field.

22. The location was further corroborated through forensic examination of photographs provided by one of the witnesses. The forensic institute stated that, while there was no Global Positioning System information in the metadata, comparative image analysis indicated that the pictures had likely been taken at the same location.

Location No. 2

23. A second unexploded barrel bomb was reported to have landed in a northern neighbourhood by a witness and an independent organization that published this information on open sources. There is, however, some discrepancy about the locations, which are more than 200 m apart (see table). The witness also indicated that the remnants of the device were buried in a nearby field.

Coordinates of location No. 2 as provided by different sources

Source	*Latitude (decimal)*	*Longitude (decimal)*
Witness	N35.959185°	E36.713626°
Open source	N35.957925°	E36.711673°

24. A report published on an open source referred to the same location and remnants, but indicated that the incident had occurred on 23 March 2015 at 1430 hours. A video from that date was also posted, as well as the recovery of the remnants, which was indicated to have taken place on 26 March 2015.

25. No additional information is available with regard to the second reported barrel bomb. The Mechanism has been unable to find additional or corroborating information on the second impact location.

Munition

26. A witness identified location No. 1 and described the munition as a barrel bomb, which the witness thought contained six canisters filled with chemicals. The witness estimated the size of the munition as approximately 60 cm in diameter and 150 cm in length. At least one of the canisters remained intact.

27. Pictures of the outer jacket of the munition at location No. 1 were received from a source. Forensic examination was pending at the time of submission of the present report. The same source stated that at least one unexploded canister and a plastic bottle with a dark, crystallized liquid recovered from location No. 1 was in its possession. There was no evidence of remnants of any other canisters.

28. The chain of custody for the remnants was attested by the source based on the testimony of a witness and a written confirmation by the organization that had collected the samples.

29. The same source also provided a laboratory report on the canister and the content of the plastic bottle. The report indicates that the recovered canister is a hydrochlorofluorocarbon gas canister. Although the content had leaked from a rupture in the bottom, traces of chlorine or a chlorine-like substance had been found on the inside of the canister. The report concluded that the content of the plastic bottle had been potassium permanganate. The source shared its assessment that the munition consisted of multiple hydrochlorofluorocarbon gas canisters, in addition to several plastic bottles containing potassium permanganate, placed in a large barrel.

30. The two other witnesses who were first responders stated that they had recovered remnants of both munitions and buried them out of fear of the chemicals that they believed to be contained therein. The Mechanism could not confirm the location in which the remnants had allegedly been buried.

31. There is no video documentation of the impact location, the dismantling and excavation of the munition, the remnants or the crater. Pictures of the location where the remnants were allegedly buried, including of the outer jacket of the munition, were submitted to the Mechanism on 19 August 2016 and sent for independent forensic analysis, the results of which were pending at the time of submission of the present report.

Delivery method

32. According to three witnesses, a Syrian Arab Armed Forces helicopter dropped barrel bombs containing chemicals. Open sources indicated that continuous air operations were taking place over Binnish during the period, including on 24 March 2015, which was also confirmed by other sources.

33. The Government indicated that no Syrian Arab Armed Forces flight operations had taken place in the Binnish area on 24 March 2015, but did not provide supporting documentation such as flight records.

34. Two sources shared their assessment that, on 24 March 2015 at 1930 hours, a helicopter departed from Bassel al-Assad Airport in Ladhiqiyah in the direction of Idlib. It passed over Binnish at 2015 hours and returned to its base at 2107 hours.

35. The specific times referred to above do not, however, correlate with the time of the incident (1900 hours), when the first affected people sought medical assistance.

Damage and effects

36. Two witnesses had visited the impact location in the agricultural field (location No. 1) and noted damage to the vegetation manifested by a distinct yellow colour and "dead flora" in the area of the impact. Pictures of the area of damaged foliage were provided to a forensic laboratory and show that they had been taken in Binnish.

37. Satellite imagery analysis indicated that, while no crater was visible, there was a soil distortion that might be related to an impact. A vegetation index analysis showed that, at the location and two areas in the immediate vicinity, the vegetation was less healthy. This could have been caused by chlorine, other toxic chemicals or other factors. The Mechanism obtained photographs of a site at which remnants, including an outer jacket, a canister and a plastic bottle, had been buried, but cannot corroborate that this site is also the original impact site.

Medical effects

38. The Binnish hospital registered 21 patients relating to the incident: 10 were mild cases, 10 were moderate cases and 1 was a severe case. The clinical examination demonstrated that most of the cases presented with coughing, difficulty breathing and drowsiness. There were no deaths reported. Two witnesses confirmed the testimony of the treating physician interviewed by the fact-finding mission with regard to the extent and type of symptoms.

39. Two witnesses had indicated that all patients had been decontaminated, including washing of exposed skin, outside the hospital, 5 to 10 m from the emergency room. The physician did not smell a chlorine odour emanating from the clothing, but was informed of the smell by the patients. The video appears to show patients entering the hospital directly, without having been decontaminated.

40. A forensic analysis of the plume effect of the chlorine dispersion on the date and at the time of the incident indicates that the number of reported injuries is consistent with the use of chlorine under the prevailing weather conditions. This analysis did not, however, take into account the topography and any obstacles, such as houses.

41. The Government shared its assessment of a video retrieved from an open source. The video, entitled "Poisonous chlorine gas leads to suffocation in the countryside of Idlib", shows patients being treated in a health facility. The Government indicated that, according to its analysis, the video had been staged.

42. Independent forensic analysis indicated that the creation date of the file, on the basis of the information in the metadata, was 29 March 2015 at 0330 hours. The creation date is likely to correspond to the date on which the modified file was created, rather than the original file.

43. Photographs of the patients taken in the hospital at the time of the incident have been forensically examined, and the conclusion reached is that the pictures were taken in the same place.

44. Whether the scenes in the footage are "staged" cannot be determined by video analysis. It is noted, however, that the patients appear relatively unaffected by the typical symptoms. No red eyes, tearing, paleness, sweating, cyanosis or breathing difficulties can be observed from the footage. The patients interviewed in the video show little or no signs of having been exposed to a toxic chemical.

45. The video material on the Binnish case shows only the activity at the hospital.

Leadership Panel's assessment

46. The Leadership Panel examined the available information regarding the incident in Binnish on 24 March 2015 and was able to confirm the existence of a canister with traces of chlorine or a chlorine-like substance. It has received additional information in relation to remnants of the outer jacket of a device that is consistent with the construction of a barrel bomb.

47. The Leadership Panel was close to having sufficient information to reach a conclusion on the actors involved on the basis of the chain of custody for the remnants found and the overall findings of the fact-finding mission. However, there are inconsistencies in the case, including the link between the remnants and the impact site or sites, accounts of the explosion and the individuals affected, which are being further investigated.

48. This assessment was based on the following:

- According to three witnesses, a Syrian Arab Armed Forces helicopter dropped a device or "barrel bomb" with chemicals at night over Binnish. However, there are inconsistencies in relation to the date and time of the incident, the impact location or locations and the description of the exposure to toxic chemicals suffered by the local population.
- Notwithstanding the inconsistencies and scarcity of information surrounding this case, the Mechanism has been able to corroborate some key elements, such as the remnants recovered by local responders from an agricultural field in Binnish, which were subsequently recorded and documented. The remnants found at location No. 1 — the outer jacket, a canister and a plastic bottle — are consistent with the construction of a barrel bomb. The canister and the content of the plastic bottle were analysed by a laboratory, which found traces of chlorine or a chlorine-like substance in the canister. The laboratory also

concluded that the content of the plastic bottle had been potassium permanganate. The chain of custody for the remnants was established.

- The Mechanism could not obtain any information concerning the explosion of the device. Nevertheless, it has received information on the impact location, which is being forensically analysed.

Annex X

Marea, 21 August 2015

Findings of the fact-finding mission

1. The fact-finding mission stated the following: "The team can conclude ... with the utmost confidence that at least two people were exposed to sulfur mustard ... [and] it is very likely that the effects of sulfur mustard resulted in the death of an infant."[1]

Mechanism's investigation

Background

2. Marea (Aleppo governorate, I'zaz district) is located 35 km north-east of Aleppo city and 18 km south of the Bab al-Salam border crossing with Turkey. In the census conducted in 2004, Marea had a population of close to 17,000 in the city and 40,000 in the subdistrict.

3. In July 2015, two coalitions of armed opposition groups (Fath Halab and Ansar al-Sharia) launched a major offensive against government forces in the west of Aleppo city, capturing the Scientific Research Centre to the west of the Jam'iyat al-Zahra' front line.

4. Islamic State in Iraq and the Levant (ISIL),[2] which controlled territory to the east, north-east and south-east of Aleppo city, took advantage of the armed opposition groups' engagement with government forces to advance westward towards Marea. This was of strategic importance in the light of the location of Marea, near key routes through I'zaz and the Bab al-Salam border crossing.

5. By August 2015, Ahrar al-Sham, Faylaq al-Sham and other Free Syrian Army-affiliated groups had moved reinforcements to Marea to counter the ISIL advance towards the west. Heavy clashes were reported in Tilalayn to the north and Umm Hawsh to the south. By 26 August, however, ISIL had circled Marea on three sides, effectively besieging it.

6. Marea had been a traditional stronghold of armed opposition groups, such as Liwa' al-Tawhid, whose leadership originated there. Other armed opposition groups present in August 2015 included Jabhah al-Shamiyah, its faction Thuwar al-Sham, Faylaq al-Sham, Ahrar al-Sham, the 101st Infantry Brigade, Firqah 13 and Jaysh al-Thuwar. The Nusrah Front was also present in and around Marea.

7. The Hurriyah hospital in Marea is supported by a non-governmental organization. It provides mainly emergency health care and transfers severe cases to Tall Rif'at hospital.

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[1] See S/2015/908, enclosure IV, annex 2, para. 4.6.

[2] On 30 May 2013, Islamic State in Iraq and the Levant and the Nusrah Front were designated as terrorist groups by the Security Council in accordance with resolution 1267 (1999).

Narratives

8. The fact-finding mission stated that, on 21 August 2015 at around 1000 to 1130 hours, over the course of approximately 90 minutes, Marea had been bombarded by around 50 projectiles.[3]

9. Several witnesses, other sources and independent entities supported that description of the events, stating that, on 21 August 2015, more than 50 artillery projectiles, including several filled with sulfur mustard, had been fired towards Marea from the east or south-east. On that and the following days a number of people went to hospital with symptoms relating to exposure to sulfur mustard.

10. The Mechanism considered an alternative hypothesis, in which an accident occurred in Marea, whether an operational incident, for example while trying to fill munitions with sulfur mustard, or leakage caused by the detonation of a conventional munition. However, no information was found to substantiate the theory, which would also not explain the exposure of the victims.

Date and time

11. Two eyewitnesses stated that Marea had been subjected to artillery fire on 21 August 2015. Five other sources stated that that had occurred on 21 August 2015 between 0930 and 1130 hours. The Government shared its assessment that the shelling had begun at 0930 hours.

Weather conditions

12. On 21 August 2015, between 0900 and 1100 hours, the wind came from the west (280°) at a speed of 5 m/s. The temperature increased from 27°C to 32°C and the relative humidity fell from 90 per cent at 0900 hours to 83 per cent at 1100 hours.

Impact location

Location No. 1

13. One artillery shell hit a house "close to the vegetable market" in the south-east of Marea. Two witnesses gave the address as "al-tariq al-mu'abbad", or "the paved street".

Location No. 2

14. Another artillery shell fell in the courtyard of a house. An individual who disposed of the shell was exposed to a dark liquid that leaked from it.

Other locations

15. A witness mentioned several additional impact points of artillery shells across the city, with some landing close to the water reservoir. The Mechanism has no indications of whether those shells were filled with sulfur mustard.

[3] See S/2015/908, enclosure IV, annex 2, para. 3.7.

16. A map provided by an independent organization shows multiple impact sites of artillery shells equally distributed throughout the city. Among those indicated impact points, it is unclear which shells were filled with sulfur mustard.

Munition

Location No. 1

17. Some witnesses said that their house "had been shelled", but provided no further information on the exact type of delivery method or munition.

Location No. 2

18. A witness provided pictures of artillery shells, stating that they were 130 mm shells and that the shell had created a small hole in a wall of a house and removed a small piece (10-16 cm) of tarmac.

Location No. 3

19. A witness said that an unexploded artillery shell had landed on a roof of a house in the south-east of Marea.

General

20. Witnesses stated that on 21 August 2015 more than 50 artillery shells had fallen all over the city of Marea. One stated that the artillery shelling had lasted more than an hour, with a frequency of one shell per minute. Several open sources also refer to artillery shelling of Marea on 21 August.

21. Four other sources stated that the munition used in all those locations had been 130 mm artillery shells. Those shells are thought to be easily repurposed and filled with different payloads.

22. The Mechanism received more than 20 photographs and 61 videos of the munition used in Marea from various sources, witnesses and entities. Some of the photographs indicate that the agent release method of the munition was improvised and unsophisticated. Forensic examination of the photographs with regard to the munition type was inconclusive. The photographs of the munition show that it had been moved from the impact point to the location where the photographs and videos had been taken.

Delivery method

23. In relation to 130 mm artillery shells, the Government stated that it had not abandoned, nor had any armed opposition group seized, 130 mm towed field guns, which were used to launch the munitions, during its retreat from the area in December 2012. The Government stated, however, that ISIL might have had access to such weapons in northern Iraq, which was under ISIL control. Open sources show pictures of ISIL in possession of 130 mm artillery shells and towed field guns.

24. A witness reported having seen artillery shells being launched from a roof. According to this witness, the shelling originated from either Tall Malid (about 5 km to the south-east) or from Tall Sayyid Ali, a few hundred metres south of Tall Malid. Another witness stated that ISIL had launched the shells from Hawar

al-Nahr (about 5 km to the north-east) or Ihtaymilat (about 10 km to the north-north-east).

25. Several sources, including the Government, stated that the shells had come from the east.

26. The Mechanism attempted to corroborate the direction whence the shells had come and requested a forensic institute to conduct imagery analysis, including a comparison with satellite imagery. The analysis did not, however, yield tangible results. The forensic institute confirmed that the videos and photographs analysed had not been tampered with. The Mechanism could not establish a direct link between the images and exposure of people.

27. The Mechanism requested additional satellite imagery of the area around Marea to identify a potential source. Some imagery was received on 19 August and analysis is continuing.

Damage and effects

28. The videos from one of the impact locations show much destruction and damage to the houses. No crater can be seen. One witness said that the artillery shell had created a small hole in a wall of a house and removed a small piece (10-16 cm) of tarmac.

Medical effects

29. A family of four residing in the house at location No. 1 were exposed to sulfur mustard. The exposure of two of them was confirmed by the fact-finding mission. In addition, a witness stated that a family of five had been exposed.

30. One individual was exposed while removing an artillery shell. There is a video of the individual in hospital, in which clinical symptoms such as blisters on the left leg can be seen. The person stated that, when carrying a shell in order to bury it in the ground, a liquid had leaked out over the leg, causing the blisters. A witness confirmed the identity of the injured person who appeared in the video. Forensic analysis yielded no further information.

31. Different sources report up to 85 people seeking medical assistance with injuries and symptoms relating to sulfur mustard exposure over the following four days. The number of injured have been cross-checked with reports from several sources, who indicated numbers as "at least 10", "50" and "up to 85" casualties. One witness said that 23 people had sought medical attention on 21 August 2015, and more than 60 over the following few days.

32. The medical effects described by the fact-finding mission were consistent with witness statements and reports of independent organizations.

33. To find more information on the munition and delivery method, the Mechanism undertook several activities to identify additional victims. No additional victims have been found to date, however.

Further information

34. Sulfur mustard is a colourless, viscous liquid, odourless in its distilled, pure form. If not stabilized properly, however, it can easily polymerize, resulting in a

yellow-brown liquid of increasing density with an odour resembling mustard plants, garlic or horseradish.

35. Several witnesses, entities and other sources referred to the bad smell in the area (e.g., of garlic or rotten eggs or as irritating or very bad). Several pictures from various sources show a dark viscous liquid. An examination by a forensic institute could neither confirm nor exclude that the liquid shown in the photograph is sulfur mustard.

36. Multiple sources suggested that the sulfur mustard in question was undistilled and had been generated through the Levinstein process. According to them, the bad smell (rotten eggs) and colour of the substance (dark green or blue) were consistent with sulfur mustard used by ISIL in other incidents, including in a neighbouring State. The olfactory observation of a rotten smell supports the assessment that the sulfur mustard may have been produced through the Levinstein process. The smell is stronger when undistilled, similar to that of rotten eggs, owing to impurities in such reactions.

37. Some sources provided information that indicated that ISIL had the capacity to produce sulfur mustard through the Levinstein process.

38. The Organization for the Prohibition of Chemical Weapons confirmed that the sulfur mustard from the Syrian Arab Republic did not contain impurities such as polysulphides, meaning that another process was used by the Government. It also reported that the sulfur mustard used by ISIL in northern Iraq on several occasions in 2015 and 2016 had been produced through the Levinstein process.

39. The Mechanism requested clothing from victim, and environmental or certain biomedical samples. Nothing was made available to the Mechanism for further analysis, however, repeated requests notwithstanding.

40. There is insufficient information available to draw conclusions on the origin of the sulfur mustard used during this incident.

Leadership Panel's assessment

41. The Leadership Panel examined the existing information regarding the incident in Marea on 21 August 2015 and determined that there was sufficient information to conclude that ISIL was the only entity with the ability, capability, motive and means to use sulfur mustard in Marea on 21 August 2015.

42. This conclusion was based on the following:

- Marea had been a traditional stronghold of armed opposition groups, which were fighting against government forces. On 21 August 2015, ISIL advanced westward towards Marea.
- Several witnesses and a number of other sources provided information that Marea had been bombarded by around 50 artillery shells, several of which filled with sulfur mustard, from the east or south-east, an area under the control of ISIL.
- On that and the following days a number of people went to hospital with symptoms related to exposure to sulfur mustard.

- A large number of photographs and videos of the munition used in Marea were received and analysed by the Mechanism. Four sources stated that the munition used was 130-mm artillery shells. The photographs and videos of the munition are consistent in relation to the release of a dark viscous liquid from the artillery shell.